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TEXTILE WORLD RECORD

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The
National Association
of
Cotton Manufacturers
at
Bretton Woods.

Cotton Goods and Free Trade With the Philippines.

Carded Woolen Manufacturers and the President's Winona Speech.

International Short Time.

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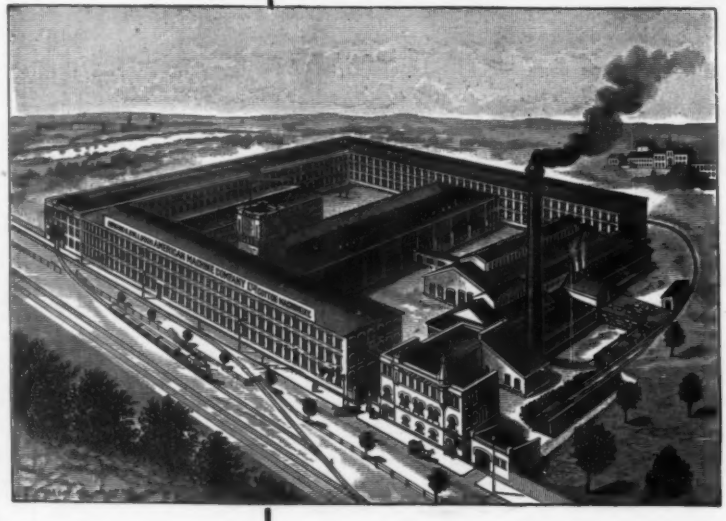

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The Textile World and Textile Record.

VOL. 38 (NEW SERIES.) October, 1909 No. 1

Monthly Comment.

Framing a Sliding Scale.

The effort now being made in Lacashire by representatives of cotton employers and operatives to frame a sliding scale by which wages in cotton mills shall be automatically adjusted is of importance, not only in England, but to every cotton manufacturing country. Success means putting an end to the ruinous strikes or lockouts that mark the present method of adjusting wages by main strength.

It was at the suggestion of Winston Churchill, President of the Board of Trade, that the employers and employes, through their organizations, consented to enter into negotiations for the purpose of framing a conciliation scheme for adjusting wages. The conferences have an independent chairman, Sir Edward Clarke, who was named for the position by the Government. A preliminary conference was held last April and the second session was held on Oct. 11. The meetings are necessarily secret, as the negotiations would be hampered if not made impossible by a public discussion of the question. It is not to be inferred from this secrecy, however, that public opinion is to be ignored. On the contrary British public opinion was the most important factor in bringing about this conciliation conference, evidence of this being found in the part taken by the Government in suggesting the plan and in naming the presiding officer. Another and more direct indication of the popular impatience with strikes, lockouts and their accessory, organized short time, was supplied some time before when the English cotton trade received plain notice from the public that the short time remedy had its limitation. British public opinion is in favor of some better means of adjusting wages than by strikes and lockouts, even though these be brought about in accordance with the Brooklands agreement. And it is mainly in obedience to this public opinion that the representatives of the public and of Lancashire employers and employes are now engaged in the work of framing an automatic plan of regulating wages in cotton mills. With the attention of the public concentrated on them, the effort will not be abandoned until every means for attaining success has been exhausted. And success will mean much not only to Lancashire, but to the cotton trade of the world.

A Pure Textile Law.

During the recent discussion of the tariff bill in Congress there were frequent references to the desirability of a pure textile law, similar to the pure food law, which would provide the consumer with a guarantee that textile goods were in fact what the merchant represented them to be. Now that the tariff bill has been made a law the discussion of a pure textile law continues, and the daily papers contain frequent references to such a measure, invariably in favor of the measure.

Pure textile laws have been discredited by

the attempts made several years ago to pass what was known as the "Grosvenor shoddy bill." This journal was first and foremost in exposing the absurdity and impossibility of the Grosvenor bill. Our editorial, "Threatened Chaos in the Woolen Industry," published in January, 1902, did more than defeat the Grosvenor shoddy bill; it made that and similar measures ridiculous. The lapse of nearly eight years has dimmed the memory of this exposure of January, 1902, and it is possible that another set of politicians and reformers may now bring forward a so-called "pure textile law" as impossible and ridiculous as the Grosvenor shoddy bill.

There is no doubt but that the retail buyer of textile goods needs protection, but this protection is needed chiefly against the misrepresentations of retail salesmen. Textiles are sold by the manufacturers for what they are in fact. Misrepresentation of the character of the goods cannot be successfully practiced, by the manufacturer, except within very narrow and negligible limits. It is after the goods leave the manufacturer's possession that the most remarkable transformations take place. American goods become the "imported article." Cotton changes to silk or linen. Silk is transformed to wool. Mixtures of cotton and wool change to all wool. And in these new forms they are sold to the ultimate consumer. We have devoted some time during the past eight years to the study of this question of misrepresenting the character of textile goods. And now at this early stage of a recrudesence of the agitation for remedial measures we venture to suggest that would-be reformers, whether in the House of Representatives, in the Senate, in executive positions or outside of these places, could render a real service to the American people by taking the precaution to determine the facts regarding textile goods and the abuses connected with their sale before they formulate legal remedies.

Short Time to Continue in Lancashire.

The further advance in the price of raw cotton and the continued dullness and low prices in the yarn market led the English spinners of American cotton to decide last month that the short time schedule on which the mills had been running should be continued after the date (Sept. 27) set for the expiration of the agreement. The decision was reached at a mass meeting of cotton spinners at Manchester and embodied in the following resolution:

> That this meeting is of opinion that the short time movement in the American spinning section should be continued beyond the date originally fixed (September 27) by stopping the mills each Saturday and Monday in the following weeks: October 2 and 4, 9 and 11, 16 and 18, 23 and 25, 30 and November 1, November 6 and 8, or an equivalent stoppage during such period of 93 hours.

It was stated at the meeting that not less than 97 per cent. of the members of the English Cotton Federation had carried out the original agreement, while firms outside of the Federation and operating four and one-half million spindles had also run on the short time schedule. The resolution given above was adopted unanimously, it being the general opinion that it would be folly to abandon short time, while a continuance of the policy would benefit the spinning trade by lowering the price of raw cotton and strengthening the cotton yarn market. J. B. Tattersall, of the Federation, who will be remembered as having visited this country with the foreign delegation at the time of the Atlanta Cotton Conference in 1907 and whose frankness and good humor won for him the title of an "Arkansas Colonel" put the case bluntly at the Manchester meeting in the following words:

> The short-time movement should be continued for this, if for no other, reason—the fact that at the commencement of a new cotton season "middling American" was approaching 7d. (14 cents) per pound. In view of the action of speculators and manipulators it rested with members of the industry to present a united front in their own interest, so that the action of those people (very largely outside the trade) can be efficiently grappled with.

It is stated that the decision to run on short time affects 25,000,000 spindles and 70,000 operatives. The amount of wages lost by reason of the short time from the beginning of the present schedule until the date set for its termination is estimated at $1,500,000.

Cotton Goods and Free Trade with the Philippines.

The free admission of imports into the Philippines from the United States is provided by Section 5 of the Payne tariff:

In consideration of the exemptions aforesaid, all articles, the growth, product, or manufacture of the United States, upon which no drawback of customs duties has been allowed therein, shall be admitted to the Philippine Islands from the United States free of duty; and provided further, That the free admission, herein provided, of such articles, the growth, product, or manufacture of the United States, into the Philippine Islands, or of the growth, product, or manufacture, as herein before defined, of the Philippine Islands into the United States, shall be conditioned upon the direct shipment thereof from the country of origin to the country of destination: Provided, That direct shipment shall include shipments in bond through foreign territory contiguous to the United States.

This section providing for free trade between the Philippines and the United States makes the Philippine tariff on imports from foreign countries a protective tariff for American manufacturers as far as the Philippine market is concerned. As a result the Philippine tariff rates are of special interest to those of our manufacturers who are selling or propose to sell their products in the archipelago.

In 1908 the imports of all kinds into the Philippines amounted to $29,186,120, of which the largest item was cotton goods, valued at $7,216,442. Of this quantity of cotton goods $3,662,199, or 51 per cent., came from Great Britain; and $590,730, or 8 per cent., from the United States. The balance was divided for the most part between Belgium, France, Germany, Italy, the Netherlands, Spain and Switzerland, the last named country supplying the largest amount, $568,864, or nearly as much as came from the United States. This was the state of trade with all countries competing under equal tariff conditions. Under the Payne bill the manufacturers of the United States will have the advantage of free entry of their goods into the Philippines, while the goods from other countries will be subject to the rates provided by the Philippine tariff which recently went into effect.

Our exporters and manufacturers have found it difficult to understand what the Philippine tariff is, even with the bill before them, because the rates and classifications are based on metric weights and measures. Long and complicated calculations, in which serious errors are easily made, are necessary to reduce the rates to the American basis. Some idea of this difficulty is obtained by trying to determine the Philippine duty on a 7 yard 64 by 64 cotton print from the following Philippine classifications and rates:

97. Textiles, plain and without figures, napped or not, weighing eight kilos. or more per one hundred square meters, having:

(a) Up to eighteen threads, kilo., ten cents.

(b) From nineteen to thirty-one threads, kilo., fourteen cents.

(c) From thirty-two to thirty-eight threads, kilo., twenty cents.

(d) From thirty-nine to forty-four threads, kilo., twenty-six cents.

(e) Forty-five threads or more, kilo., thirty-two cents.

[The number of threads in each case is for warp and filling in a square of 6 millimeters.]

Provided, That any textile classified under this paragraph, stamped, printed, or manufactured with dyed yarns, shall be dutiable as such, with a surtax of thirty per centum.

If there is anyone who still favors the adoption of the metric system in this country we suggest, as a means of learning his mistake, that he calculate the Philippine duty on the above named cotton print from the given particulars.

The difficulty caused by the use of the metric weights and measures, and the desire on the part of many manufacturers and exporters to know to what extent they are protected by the Philippine tariff against foreign competition, have led us to reduce the Philippine cotton goods schedule to the English basis:

Class 5. Cotton and Manufactures Thereof.

By the number of threads in a textile shall, unless otherwise stipulated, be meant the total number of all threads contained in the warp and weft thereof in a square of one inch.

Group 1. Cotton Waste.

91. Cotton waste, ten per centum ad valorem.

Group 2. Yarns, Threads and Cordage.

92. Yarns, not otherwise provided for, in hanks, cops or bobbins, fifteen per centum ad valorem.

93. Yarns or threads for sewing, crocheting, darning or embroidering, and mercerized yarns or threads, twenty-five per centum ad valorem.

94. Threads or twines for sewing sails and sacks; rope and cordage, fishing nets, and wicks for making candles and matches, twenty per centum ad valorem.

95. Hammocks, tennis nets, and manufactures of netting not otherwise provided for, forty per centum ad valorem.

96. Felts, batting, and mops and swabs of cotton yarns, fifteen per centum ad valorem.

Group 3. Textiles.

When textiles, included in this group, contain an admixture of materials, are broched, embroidered, trimmed, or made-up, they shall be subject to the corresponding surtaxes prescribed in General Rules Two to Eleven, inclusive.

Textiles woven with a colored yarn on the selvage, or with a colored selvage stripe not exceeding 1/4 inch in width, shall not be considered as manufactured with dyed yarns.

97. Textiles, plain and without figures, napped or not, weighing 14.74 lbs. or more per 100 sq. yds. (measuring 6.78 sq. yds. or less per lb.), having:

(a) Up to 76 threads, 4.54 cents per pound.

(b) From 77 to 131 threads, 6.36 cents per pound.

(c) From 132 to 161 threads, 9.09 cents per pound.

(d) From 162 to 186 threads, 11.81 cents per pound.

(e) 187 threads or more, 14.54 cents per pound.

Provided, That any textile classified under this paragraph, stamped, printed, or manufactured with dyed yarns, shall be dutiable as such, with a surtax of thirty per centum; and

Provided further, That no embroidered textile classified under this paragraph shall pay a less rate of duty than twenty-five per centum ad valorem, and any embroidered textile so classified shall be subject to all of the surtaxes applicable thereto under this Act, computed upon the ascertained amount of duty, whether the rate found applicable shall be specific or ad valorem.

98. The same, weighing less than 14.74 lbs. per 100 sq. yds. (measuring 6.78 sq. yds. or more per pound) having:

(a) Up to 76 threads, 8.18 cents per pound.

(b) From 77 to 131 threads, 12.27 cents per pound.

(c) From 132 to 161 threads, 15.45 cents per pound.

(d) From 162 to 186 threads, 18.18 cents per pound.

(e) 187 threads or more, 22.73 cents per pound.

Provided, That any textile classified under this paragraph, stamped, printed, or manufactured with dyed yarns, shall be dutiable as such with a surtax of forty per centum; and

Provided further, That no embroidered textile classified under this paragraph shall pay a less rate of duty than twenty-five per centum ad valorem, and any embroidered textile so classified shall be subject to all of the surtaxes applicable thereto under this Act, computed upon the ascertained amount of duty, whether the rate found applicable shall be specific or ad valorem.

99. Textiles, twilled or figured in the loom, napped or not, weighing 18.43 lbs. or more per 100 sq. yds. (measuring 5.42 sq. yds. or less per pound) having:

(a) Up to 76 threads, 6.36 cents per pound.

(b) From 77 to 131 threads, 8.18 cents per pound.

(c) From 132 to 161 threads, 10.91 cents per pound.

(d) From 162 to 186 threads, 13.63 cents per pound.

(e) 187 or more threads, 15.45 cents per pound.

Provided, That any textile classified under this paragraph, stamped, printed, or manufactured with dyed yarns, shall be dutiable as such, with a surtax of thirty per centum; and

Provided further, That no embroidered textile classified under this paragraph shall pay a less rate of duty than twenty-five per centum ad valorem, and any embroidered textile so classified shall be subject to all of the surtaxes applicable thereto under this Act, computed upon the ascertained amount of duty, whether the rate found applicable shall be specific or ad valorem.

100. The same, weighing less than 18.43 lbs. per 100 sq. yds. (measuring 5.42 sq. yds. or more per pound), having:

(a) Up to 76 threads, 10.91 cents per pound.

(b) From 77 to 131 threads, 14.54 cents per pound.

(c) From 132 to 161 threads, 19.09 cents per pound.

(d) From 162 to 186 threads, 23.63 cents per pound.

(e) 187 threads or more, 27.27 cents per pound.

Provided, That any textile classified under this paragraph, stamped, printed, or manufactured with dyed yarns, shall be dutiable as such, with a surtax of forty per centum; and

Provided further, That no embroidered textile classified under this paragraph shall pay a less rate of duty than twenty-five per centum ad valorem, and any embroidered textile so classified shall be subject to all of the surtaxes applicable thereto under this Act, computed upon the ascertained amount of duty, whether the rate found applicable shall be specific or ad valorem.

101. Piques of all kinds, 17.27 cents per pound.

Provided, That no article classified under this paragraph shall pay a less rate of duty than thirty per centum ad valorem.

102. Cotton blankets:

(a) Stamped, printed, or manufactured with dyed yarns, in the piece 5.91 cents per pound.

(b) Other, in the piece, 4.54 cents per pound.

Provided, That all cotton blankets, single or in pairs, hemmed, or bound, or not, shall be dutiable under this paragraph, with a surtax of thirty per centum.

103. Plushes, velvets, velveteens, and other pile fabrics (except in towels and bathrobes) subject to the provisions of Rule Six, 22.73 cents per pound.

104. Bathrobes and towels manufactured of pile fabrics, twenty-five per centum ad valorem.

105. Knitted goods, subject to the provisions of Rule Six:

(a) In the piece, twenty per centum ad valorem.

(b) In jerseys, undershirts, drawers, stockings, or socks, twenty-five per centum ad valorem.

(c) In other articles, thirty-five per centum ad valorem.

Provided, That any article classified under this paragraph, embroidered, shall be dutiable as such, with a surtax of thirty per centum, computed upon the ascertained amount of duty under the corresponding clause thereof.

106. Tulles, subject to the provisions of Rule Six, plain or figured or embroidered on the loom, 25.45 cents per pound:

Provided, That no article classified under this paragraph shall pay a less rate of duty than thirty per centum ad valorem, and

Provided further, That any of the same embroidered or figured after weaving, out of the loom, shall be dutiable according to the respective clause, with a surtax of sixty per centum; and

Provided further, That if the embroidery consists of metal threads the surtax shall be eighty per centum; and

Provided further, That these surtaxes shall be computed upon the ascertained amount of duty, whether the rate found applicable be specific or ad valorem.

107. Laces and blondes, subject to the provisions of Rule Six:

(a) Lace curtains, bedspreads, pillow shams and bed sets, unhemmed, hemmed, or bound, made on the Nottingham lace-curtain or warp machines, 22.73 cents per pound.

(b) Other, sixty per centum ad valorem.

108. Carpeting, thirty per centum ad valorem.

109. Textiles called tapestries:

(a) In the piece, 9.09 cents per pound.

(b) In made-up articles, 13.63 cents per pound.

Provided, That no article classified under this paragraph shall pay a less rate of duty than forty per centum ad valorem.

110. Wicks for lamps, including weight of immediate containers, 6.81 cents per pound.

111. Trimmings, ribbons, braids, tape, and galloons, including weight of immediate containers (see Rule Seven):

(a) Tape, boot straps, 9.09 cents per pound.

(b) Other, 22.73 cents per pound.

Provided, That no article classified under clause (b) of this paragraph shall pay a less rate of duty than thirty per centum ad valorem.

112. Shoe and corset laces, including weight of immediate containers, 15.91 cents per pound.

113. Cinches, saddle girths, reins, halters, and bridles, twenty-five per centum ad valorem.

114. Ribbons or bands for the manufacture of any of the articles enumerated in paragraph 113, fifteen per centum ad valorem.

115. Waterproof or caoutchouc stuffs in combination with cotton textiles, and cotton elastic textiles manufactured with threads of gum elastic and manufactures thereof, twenty-five per centum ad valorem.

116. Manufactures of cotton, not otherwise provided for, twenty-five per centum ad valorem.

The most important article among the cotton goods imported into the Philippines is prints, and we have calculated the Philippine and Payne rates on a standard grade, in order to compare the two tariffs. The cloth selected is a print made from a 28 inch 64 by 60 cloth. Tests of a number of pieces of these printed goods gave the following average:

Threads $69 \times 57 = 126$.

Weight 7.62 yards, 24 1/2 in., per pound.

Width 24 1/2 inches.

Value 4.4 cents.

This reduced to a square yard basis gave the following:

Threads $69 \times 57 = 126$.

Weight 5.18 square yards per pound.

Value 6.5 cents per square yard.

This cloth if imported into the Philippines would be assessed under paragraph 97 (b) 77 to 131 threads, 6.36 cents per pound, or .834 cent per running yard, with a surtax of 30 per cent. added, making the total Philippine duty 1.084 cents per running yard, 24 1/2 inches wide.

If brought into the United States this cloth would be assessed under paragraph 316 of the Payne law at 3 3/4 cents per square yard, or 2.55 cents per running yard, 24 1/2 inches wide. Assuming the foreign valuation to be 10 per cent. less than the American price, we have 3.96 cents per yard, 24 1/2 inches wide, as the basis on which to calculate the ad valorem equivalent of the specific duty. On this basis the Philippine duty of 1.084 cents a yard is equal to 27 per cent. ad valorem; the Payne duty of 2.55 cents a yard being equal to 64 per cent. ad valorem.

It will be interesting to watch the development of our exports of cotton goods to the Philippines under a protection of 27 per cent. ad valorem, and the results cannot fail to have an important bearing on the discussion of the Payne rates on cotton goods imported into the United States.

International Short Time.

The "Manchester (Eng.) Guardian" in its issue of Sept. 25th, published two cablegrams, one from the Arkwright Club of Boston to C. W. Macara, president of the International Federation of Cotton Spinners and Manufacturers' Associations, the other being Mr. Macara's reply. Theophilus Parsons, who signed the cablegram for the club, informs us that both messages were correctly reported in the "Guardian." The one to Mr. Macara is as follows:

Arkwright Club votes curtailment desirable because of lack of margin between price of cotton and goods. Ascertaining opinion of American spinners generally. What will International Federation probably do? Letter following. Parsons, President.

The President of the International Federation replied:

Received cable with greatest satisfaction. Have wired it to members International Committee strongly recommending continuance of international short time. Meeting of International Committee at Frankfort 5th October will deal with grave crisis. England having decided continuance short time, other countries are sure to follow. Macara.

Three days later, on Sept. 27, the president of the Arkwright Club cabled Mr. Macara as follows:

Cable most satisfactory. Sentiment here (north and south) entirely favorable. Hope to send you news of formal action soon, and receive same from you. Parsons, President.

SHORT TIME A NECESSARY REMEDY.

Operating mills on a short time schedule is a necessary remedy for many of the difficulties that arise in the cotton trade. The only object for men to invest their capital in cotton manufacturing is to make a profit. When manufacturing fails to yield a profit or results in a loss, stopping manufacturing operations becomes the only means of self preservation for invested capital. Outside of a small number of students who advocate running cotton mills full time when the margin of profit disappears, in order to create wealth, and therefore, prosperity and profits, there will be no dispute as to the proposition that short time is a proper and entirely justifiable remedy for a disarrangement of supply and demand in the markets for raw material and manufactured products.

A number of obvious difficulties arise if the resort to short time is left to the initiative of individual manufacturers. The remedy is delayed too long; a minority of the manufacturers, who may be affected less by the evil that short time is to remedy, keep their mills running and thus profit by the sacrifice made by the majority who restrict production; lack of organization places the manufacturing trade at a disadvantage in an industrial contest with highly organized forces in the speculative or legitimate trade in cotton and cotton goods. And so it has become of vital importance for cotton manufacturers to organize for the regulation of output.

A LOCAL ISSUE.

Aside from the somewhat indifferent success of the International Cotton Federation in promoting international short time, that drastic remedy has thus far been applied in separate districts by the respective organizations operating independently and controlled by local conditions. This division of organized work is the result of the widely varying conditions of industry and trade between different parts of the cotton world. England, France, Germany, Italy, Switzerland, Spain, Austria, Russia, the United States, each has its peculiar conditions which determine the extent of the restriction of the daily output and when it shall begin and end. Heretofore Americans have been able to look with indifference on the efforts to promote a concert of action in this matter between the different cotton manufacturing countries of Europe and Asia. Now, however, that an important executive association of American cotton manufacturers has made overtures to the International Federation looking to common action in restricting the product of both European and American cotton mills, it becomes necessary to con-

sider the relation of the United States to organized international short time.

THE FIRST OBJECTION.

The first important objection to a union of American and European cotton manufacturers to restrict the product of their mills is found in the fact that such union is designed to lower the price of the world's crop of raw cotton, of which the United States supplies about three-quarters. Take, for example, the year ending June, 1909. In that year we sold to foreign cotton spinners 4,447,985,202 pounds of cotton valued at 9 3/8 cents a pound or $417,390,665. On Saturday, October 2d, on the eve of the meeting of foreign spinners at Frankfort, Germany, to bring about short time and a reduction in the price of American cotton, middling uplands was selling at 13 1/2 cents. At that price the cotton we sold to foreign spinners in the above named year would have amounted to $600,478,002, or $183,087,337 more than was obtained, all of which would have been received by American producers, with a corresponding increase in their purchasing power. Such are the magnificent proportions of the cotton prize now at stake. Is it any wonder that the leader of the foreign spinners who buy our cotton should receive "with the greatest satisfaction" an intimation that the object of the Frankfort meeting may have support even in the United States.

AMERICANS ALL.

In their relations to foreign countries all Americans must here be considered as a unit. This is because of the peculiar industrial and social conditions in the United States, where we find a comparatively sparse population, great natural resources and, as a result, wages much higher than in foreign countries. It is to maintain this American level of wages that a protective tariff is levied on foreign products competing with our own. Such a tariff is especially necessary on manufactured cotton products because of the very low labor cost of production in foreign cotton mills and the ease with which cotton goods can be transported from one country to another. During all the time the protective tariff on cotton goods has been maintained, raw cotton has been imported free of duty. This has been due to the fact that, as far as the great bulk of the world's cotton crop is concerned, nature has given this country a practical monopoly, and free trade in cotton has prevailed in spite of the fact that in the production of certain special grades of cotton, it has exposed the American cotton planter to the competition of labor as cheap and degraded as that of the Egyptian fellahs.

Suppose that under these conditions American cotton manufacturers, protected by a tariff against the cheap labor employed by foreign cotton manufacturers, should unite with the same foreign cotton manufacturers to restrict the consumption of cotton for the purpose of impairing the protection given by nature to the American cotton raisers. Can anyone imagine a more effective means of arraying one class of American producers against another? Or a more damaging blow to the policy of tariff protection to all industries for which the resources of this country are adapted? Or a better means of putting an end to that obliteration of heretofore sharply defined sectional lines, which was a gratifying feature of the recent revision of the tariff?

WANTED, CHEAP COTTON FOR THE ASIATICS.

The American cotton manufacturer who may be influenced by the outward attractions of international short time should consider that such a step means the undermining of that tariff policy which is designed for the protection not alone of himself, but, in a greater degree, of labor in all American industries. The European cotton manufacturers want cheap cotton for the manufacture of cheap goods to be sold to the poverty-stricken hordes of Asia and Africa, on 400,000,000 of whom Great Britain imposes the curse of free trade against their will. The American cotton manufacturer might well put himself in the place of the American cotton raiser, and then consider that American tariffs may come and they may go, but the American control of the world's cotton supply goes on forever.

GAMBLING ON COTTON EXCHANGES.

The overtures for an organized restriction of the consumption of cotton by European and American manufacturers will doubtless be excused on the ground that it is aimed, not at the cotton grower, but at cotton gambling, which is one of the greatest evils in the cotton trade. To this it may be said that it is impossible to determine where a change of price due to a changing supply and demand ends and where the influence of the gambler begins. The gamblers of Wall Street may soon take a hand in manipulating the cotton market, but the rise in price as a new crop is coming on the market is strong evidence that supply and demand are the dominating factors in the present increase of the market value of cotton. Moreover short time will not put an end to the operations of gamblers on cotton exchanges, who play their game as easily for a fall as for a rise and with equally disastrous results to growers and manufacturers.

The way to end gambling in cotton is not for manufacturers to engage in an unequal contest with the gamblers, but for all branches of the trade, cotton growing, manufacturing and trading, to organize for the elimination of the evil, and then accomplish their object by a patient and scientific investigation and an international organization for applying the effective remedy. Preliminary steps in this direction were taken at the Atlanta Cotton Conference in 1907. The responsibility for the failure to find and apply the remedy rests now on those organizations, chief among which is the European Cotton Federation, which blocked the execution of the Atlanta plan to organize a permanent international cotton committee. With the sentiment of the world's cotton trade crystallized in favor of a remedy for the evils of cotton gambling, no country would refuse to enforce it through effective laws.

Whatever may be the action directed against gambling in cotton a union with foreign manufacturers to bring about international short time cannot be safely adopted by Americans. The peculiar conditions prevailing in this country forbid it, and the only safe course for American manufacturers is to adjust the running time of their mills to conform to American conditions.

French Silk Operatives and the Tariff.

The silk workers of Lyons, France, have become alarmed because of the increase in the tariffs on silks in foreign countries and the heavy importations of Chinese and Japanese silk goods into France. The committee representing the Lyons operatives have recently adopted the following resolutions in favor of prompt and effective measures to protect the French industry:

In view of the fact that the French government has heretofore made no resistance to the hostile foreign tariffs directed against France, but has submitted without protest to the most serious burdens, the committee representing the operatives of Lyons and vicinity feel called upon to protest against a continuance of this weak policy and to urge the government to adopt measures at once for the protection of the home industry, either by means of increased tariffs or by the payment of bounties and export duties. The situation is aggravated by the fact that the Paris merchants prefer cheap foreign goods to French products, having no regard for the interests of the French industry. As a result the French operatives are unable to obtain employment for a large part of the time or are forced to accept very low wages. They demand a duty of at least 7.50 francs per kilo on all pure wool silk imported into France. An adequate protective rate should be imposed upon the Chinese and Japanese products which have hitherto been admitted free, as social conditions and the standard of living in China and Japan are much lower than in France.

The Lyons city council, many of the public officers and French labor unions generally, have given their approval to these resolutions and urged the government to adopt strong measures for remedying the existing evils.

The total value of shipments of domestic merchandise from the United States to the Philippine Islands in the year ending June, 1907, amounted to $8,657,956.

While the receipts of raw cotton from the United States from January to July, 1908, amounted to $25,476,772, the importations of raw Egyptian cotton into Italy are increasing steadily, and the purchase of Indian cotton amounted to about 71,500,000 lbs.

THE CARDED WOOLEN MANUFACTURERS' ASSOCIATION.

A meeting of this association was held at the Murray Hill Hotel, New York, on Sept. 30. There was general discussion regarding the state of the industry with special attention given to the tariff question. It was the unanimous decision of the meeting that the effort to obtain justice for the carded woolen industry by an equalization of tariff rates in schedule K should be continued. Great satisfaction was expressed by all present because of President Taft's endorsement, at Winona, of the chief claims made by the Carded Woolen Manufacturers' Association. The work of the members of the executive committee of the association was strongly approved and they were directed to continue in the course they had heretofore followed. The following statement to the public was read and approved and a set of resolutions, given below, adopted:

Not only the manufacturers of carded woolen goods, but the consumers of wool goods as well, are to be congratulated on the fact that the President of the United States, in his speech at Winona, Minn., has given the great authority of his high office to the approval of the chief claims made by our association in connection with the revision of the wool and wool goods tariff.

THE PRESIDENT'S ENDORSEMENT.

These claims and the President's words of approval may be summarized as follows:

1. We have claimed that the specific duty on grease wool, which is the cause of the most serious of the inequalities in the wool and wool goods tariff, originated in a bargain between wool growers and wool manufacturers in 1867, and that it was continued in force during the framing of the Payne bill in accordance with a compact made at Chicago before election between representatives of worsted manufacturers in the East and the growers of heavy shrinking wool in the far West. The President confirms our position in the following statement at Winona:

"The difficulty about the woolen schedule is that there were two contending factions early in the history of the Republican tariff, to wit: the wool grower and the woolen manufacturers, and that finally, many years ago, they settled on a basis by which wool in the grease should have 11 cents a pound, and by which allowance should be made in the shrinkage in the differential upon wool manufactures."

"When it came to the question of reducing the duty at this hearing in this tariff bill on wool, Mr. Payne in the House, and Mr. Aldrich in the Senate, found that in the Republican party the interests of the woolgrowers in the far West and the interests of the woolen (worsted) manufacturers in the East and in other States, reflected through their representatives in Congress, was sufficiently strong to defeat any attempt to change the woolen tariff, and that had it been attempted it would have beaten the bill reported from either committee."

2. We have claimed that the specific duty of 11 cents a pound on grease wool, while low on light shrinking worsted wool, is excessive and prohibitory on the wool required for carded woolen goods, which provide wool clothing for people of moderate means. The President gave his approval to this claim in the following words:

"The percentage of duty was very heavy—quite beyond the difference in the cost of production, which was not then regarded as a necessary or proper limitation on protective duties."

3. We have insisted that the party in power is under obligations by reason of the promises in the platform of 1908, and of the pledges of its candidate for President, to revise the wool and wool goods tariff honestly and thoroughly, to the end that it might be made fair to all classes of producers and consumers. The President admits that this is the fact in the following words:

"I am sorry that this is so (that the combine of worsted manufacturers and wool growers was strong enough to defeat the bill if their demands were not complied with), and I could wish that it had been otherwise. It is the one important defect in the Payne tariff bill and in the performance of the promise of the platform to reduce rates to a difference in the cost of production with reasonable profit to the manufacturer."

"But, as I have already said, I am quite willing to admit that allowing the woolen schedule to remain where it is, is probably not a compliance with the terms of the platform as I interpret it, and as it is generally understood."

After admitting that all the essential claims made by the carded woolen manufacturers are sound, the President minimizes the importance of the question and excuses the failure to revise the wool schedule, by advancing the following propositions:

FORTY-TWO YEARS OF DISCRIMINATION.

1. The President said at Winona:

"There is a complaint now by the woolen clothiers and by the carded woolen people of this woolen schedule. They (the carded woolen manu-

facturers) have honored me by asking in circulars sent out by them that certain questions be put to me in respect to it, and asking why I did not veto the bill in view of the fact that the woolen schedule was not made in accordance with the platform. I ought to say in respect to this point that all of them in previous tariff bills were strictly in favor of maintaining the woolen schedule as it was."

The President is misinformed. From the inception of the system of specific duties on wool and by-products to the present time that system has encountered the uncompromising opposition of users of heavy shrinking wool and wool by-products. Every revision or attempted revision of the tariff since 1867 has been accompanied by emphatic protests against this specific tariff on grease wool as unjust to carded woolen manufacturers and burdensome to the consumer.

FASHION IN WOOL GOODS.

2. The President said in Winona:

"The carded woolen people are finding that carded wools are losing their sales because they are going out of style. People prefer worsteds."

Foreign and domestic fashions in wool goods change together. At the present time the carded woolen industry of Great Britain and the Continent is highly prosperous. The product of the mills is under contract at profitable prices for several months in advance. At the same time the worsted industry of Europe, while fairly prosperous, shows signs of depression. The only reason why like conditions do not prevail in the United States is to be found in the specific duty on grease wool and by-products imported into this country; and the only remedy for this difficulty with the carded woolen industry of the United States is the substitution of ad valorem for specific duties. But even if the President were correct in his opinion regarding the trend of fashion in wool goods, that would not justify in any degree whatever a continuance of the discrimination against the carded woolen industry under the tariff. Regardless of fashion, every person has a right to demand justice.

THE TARIFF AND THE COST OF WOOL GOODS.

3. The President said at Winona:

"That it (leaving the wool and wool goods tariff unchanged) will increase the cost of woolen cloth or clothes, I very much doubt. There have been increases by the natural increase in the price of wool the world over as an agricultural product, but this was not due to the tariff, because the tariff was not changed. The cost of woolen clothes behind the tariff wall through the effect of competition has been greatly less than the duty, if added to the price, would have made it."

Prohibitory duties running as high as 500 per cent. on heavy shrinking wool and wool by-products, with a rapidly increasing domestic demand for wool greatly in excess of a nearly stationary domestic supply, cannot fail to enhance unduly the cost and cause an excessive deterioration in the quality of wool goods. Both of these results are now evident to the consumers of wool goods.

THE PRESIDENT'S REASONS FOR DELAY.

4. The President said:

"Now I think it is utterly useless, as I think it would be greatly distressing to business, to talk of another revision of the tariff at the present session. I should think that it would certainly take the rest of this administration to accumulate the data upon which a new and proper revision of the tariff might be had."

As far as this wool and wool goods schedule is concerned it is impossible to "talk of another revision of the tariff," because we have not yet had the first one. With the exception of a few trifling changes the Payne schedule K is the same as the Dingley schedule K. This schedule affects what is, next to food, the most important item in the cost of living. The political party of which the President is the leader is pledged to revise that schedule, and the pledge is unredeemed. The President proposes to postpone the redemption to some indefinite future date, for two reasons: First, the attempt to redeem it now would be greatly distressing to business; and, second, because it would take the rest of this administration (three and one-half years) to accumulate data upon which a new and proper revision of the tariff might be had. We believe the President will find both these reasons to be unsound.

THE PAYNE TARIFF BOARD.

Taking the second reason first, the President stated the method of investigation as follows:

"Now there is another provision in the new tariff bill that I regard as of the utmost importance. It is a provision which appropriates $75,000 for the President to employ persons to assist him in the execution of the maximum and minimum tariff clause and in the administration of the tariff law. Under that authority I conceive that the President has the right to appoint a board, as I have appointed it, who shall associate with themselves and have under their control a number of experts who shall address themselves first to the operation of the foreign tariffs upon the exports of the United States and then upon the operation of the United States tariffs upon imports and exports."

"There are provisions in the general tariff procedure for the ascertainment of the cost of production of articles abroad and the cost of produc-

tion of articles here. I intend to direct the board in the course of these duties and in carrying them out, in order to assist me in the administration of the law, to make what might be called a glossary of the tariff or a small encyclopedia of the tariff. I do not intend, unless compelled or directed by Congress, to submit the results of these investigations, but to treat them merely as incidental facts brought out officially from time to time and as they may be ascertained and put on record in the department, there to be used when they have all been accumulated and are sufficiently complete to justify legislative recommendation upon them."

As the President points out, the first duty of the board is in connection with the application of the maximum and minimum rates to imports from all foreign countries, which is a new feature in American tariff policy. This will necessitate a study of the tariff of every foreign country, and a constant watch on the changes that foreign countries may make in their rates from time to time. For this work Congress has made an appropriation of $75,000, and the President has appointed three men. A proper discharge of their duty in connection with the maximum and minimum tariff would show an extraordinary economy in the use of the appropriation and an equally extraordinary efficiency on the part of the three members. This, their first duty, bears but an indirect relation to the revision of our tariff schedules. For these reasons there is no possibility that the maximum and minimum board of which the President speaks will be able to make any useful investigation of the United States tariff in addition to their regular duties, while a superficial examination of the question by the board would be misleading and dangerous.

Under these circumstances the tariff glossary or encyclopedia which the President is to direct the board to compile, and which is not to be published, but kept on file in the department, is not likely to aid in an honest and thorough revision of schedule K.

Moreover there is no need of a prolonged investigation to last for years before schedule K is revised. The facts regarding that schedule are well known; the remedies for the abuses caused by it are equally well known. What is needed is that Congress and the President shall do their duty; that the bill providing for an honest and thorough revision of schedule K shall not wait for years upon a new and untried tariff board but that in an orderly and constitutional manner it shall originate in and be passed by the House of Representatives, passed by the Senate and approved by the President without unnecessary delay.

DELAY MEANS DISTURBANCE.

Coming to the first reason advanced by the President for not revising schedule K now, it is not the revision of this schedule, but rather a postponement of that promised revision which is calculated to disturb business. A continuance of the tariff inequalities which are destroying the carded woolen industry and depriving the consumers of an adequate supply of wool clothing at a moderate price cannot fail to increase the popular discontent which is now threatening the prosperity of the country. If that discontent should grow until it passed the bounds of moderation and reason, the responsibility for the results will rest solely with those who resisted and refused the demand for a fair revision of the schedule on protective lines in 1909.

The President objects to a revision of schedule K now for what we believe to be the groundless fear that it will disturb business, but outlines the following policy that will keep the tariff question before the country for an indefinite period:

"By that time (the end of the present administration) the whole Republican party can express itself again in respect to the matter and bring to bear upon their representatives in Congress that sort of public opinion which shall result in solid party action."

We earnestly protest against this policy of postponement and delay by which the present inequalities in the tariff will be continued in force and the business of the country kept in a state of agitation and suspense. The time to revise schedule K is now, in order that the rates may be made to bear equally on all branches of the industry and on the consumers, and that the people may be able to devote themselves to their work and business enterprises free from the fear of tariff revision.

The honest and thorough revision of schedule K will not only remove the fear of tariff agitation in the near future, it will contribute directly and powerfully to the improvement of business by placing the carded woolen and worsted branches of manufacturing on an equal footing, and thus enable the idle carded woolen mills now dotting the country to resume operations in providing the people with a supply of warm and serviceable clothing at a moderate price.

EVENHANDED JUSTICE FOR ALL.

This statement of our case is made with the confidence that comes from a conviction that we are right. We do not believe that our reasonable demands will be thwarted indefinitely in this country by any combination of Representatives and

Senators acting for interests that enjoy special favors under the law. We seek no special privileges. We ask only for evenhanded justice for ourselves as well as for others; for the grower of heavy shrinking wools which are now excluded from the United States; for the grower of light shrinking wool and mohair, now admitted at comparatively low rates; for the worsted spinner who is enjoying special favors by reason of the low duties on his light shrinking raw material; for the carded woolen manufacturer who is oppressed by prohibitory duties on the wool and by-products he requires; for the manufacturing clothier who finds himself hampered in maintaining the standard of his products; and for the consumer of wool goods who is burdened by the arbitrary and unequal barriers to the supply of wool required for his varied needs. For all producers of raw material and manufactured products we ask for ample and equal protection under the tariff on imports.

We do not ask as a favor, we demand as a right, that the tariff on wool and wool goods shall be revised by the United States Government in 1909 in accordance with that promise which was wrung from the King by the barons at Runnymede seven hundred years ago, and which is now a basic principle of Anglo-Saxon law: "We will sell to no man, we will not deny or delay to any man, justice or right."

Edward Moir, President.
Arthur Wheelock, Secretary.

Whereas, The popular discontent and dissatisfaction with the Payne tariff law is caused mainly by the inequalities in the wool and wool goods schedule, which by the recent revision of the tariff was left unchanged, and

Whereas, The President of the United States has publicly admitted that the inequalities in this schedule should be corrected, and that it was left unchanged because of a combination of Representatives and Senators acting for the woolen (worsted) manufacturers of the East and the wool growers of the far West, and controlling enough votes to defeat the Payne bill if their demands were not acceded to, and

Whereas, A failure to equalize schedule K will result in a continuance of tariff agitation with its disturbance to business, while a prompt revision of this schedule will contribute to the stability of business by satisfying the public, and

Whereas, The proper revision of the wool and wool goods tariff schedule presents no great difficulty, but can be easily and quickly accomplished by Congress, providing the work is freed from the obstruction resulting from political bargains such as the President admits thwarted the revision of the schedule this year, and

Whereas, The prosperity and welfare of the American people depends on a maintenance of the policy of protection to all classes of producers by a tariff on imports, which policy is now endangered by the failure to correct defects in the application of that policy in respect to wool and wool goods, and

Whereas, A fair tariff on wool and wool goods must necessarily provide for an ad valorem duty on wool and wool by-products, therefore,

Be it Resolved, That it is the duty of Congress and the President to make a separate revision of schedule K without delay so that it will afford ample protection to wool growers and wool manufacturers and bear equally on all classes of producers and consumers, and thus allay the popular discontent which threatens the stability of business, and

Resolved, That such revision of schedule K should be based on an ad valorem duty on wool and wool by-products, which shall afford ample protection to the wool grower, and

Resolved, That it is the duty of carded woolen manufacturers to take an active interest in the revision of schedule K in order that the work may be done promptly and wisely, free from mistakes resulting from a lack of information on the part of the lawmakers regarding the technical conditions of the industry, and also free from the abuses and inequalities that in the past have resulted from the influence of special interests in the work of tariff revision, and

Resolved, That the thanks of the carded woolen manufacturers of the country are due to the Representatives and Senators in Congress who during the recent revision of the tariff voted and spoke for an honest and thorough revision of schedule K in accordance with the pledges in the platform of their party.

The little town of Itagua, about 20 miles from Asuncion, is the center of the paraguayan lace industry, and the grandmothers of 90 work alongside their granddaughters of 9 years of age in the long, pillared corridors of the old houses. The little children in this village of lace makers take up the needle at a very early age, and in a few years become dexterous workers.

The increasing centralization at Montreal of capital and control of great Canadian manufacturing industries is evident. The list shows 818,542 spindles and 19,324 looms in mills or branches of mills controlled in Montreal.

On May 1, 1908, there were 26,271 factories in Saxony, employing 692,895 persons, an increase on the previous year of 1,564 factories and 7,576 employes, which is noteworthy because of the general business depression.

Meeting of the National Association of Cotton Manufacturers.

The semi-annual meeting number 87 of the National Association of Cotton Manufacturers took place at Hotel Mt. Washington, Bretton Woods, N. H., Wednesday and Thursday, September 22 and 23. Its memories will linger for a long time to come with everyone who was fortunate enough to be in attendance. From the time the special train left the North Station on Tuesday morning at 10.30 until its safe arrival at Boston on Friday night nothing but words of satisfaction were heard regarding the trip and arrangements.

Transportation matters were in the hands of the Raymond-Whitcomb Co., and under the direct management of Messrs. Jones and Smith. Success and comfort were expected and fully realized. The special train started with about 150 people, the additions en route and the members and guests of the Association from Pennsylvania, New York and the South brought the number to about 250. When the Association was called to order a very gratifying representation of its membership was on hand.

Much credit is due the committee on the meeting, which consisted of Franklin W. Hobbs, chr., George S. Barnum, Frederick H. Bishop, W. Irving Bullard, Arnold C. Gardner, Frank B. Kenney, William L. Lyall, John P. Marston, Charles W. Perkins, Wallace I. Stimpson and William S. Whitney.

The reception given by President Plunkett on Tuesday evening, while informal, was a very pleasant and social feature. The evening was spent in dancing and meeting old friends and renewing old and pleasant acquaintances.

The sessions were held in the morning and evening, the afternoons being left free for mountain climbing, golf tournaments, driving and other recreations. The program was carried on, beginning Wednesday morning at 10.30, in accordance with the regular program, with President Plunkett in the chair. When he arose he received a very complimentary acknowledgment from the members and guests and introduced His Excellency, Governor Quimby, of New Hampshire in the following words:

New York is now celebrating the tercentennial of the landing of Hendrik Hudson. New Hampshire might at this time be celebrating the tercentennial of the excursion of Captain John Smith, the founder of Virginia, of Pocahontas fame, who came here in 1609. We are quite satisfied that Captain Smith little knew of the grandeur and the beauties of the territory which he discovered. He was welcomed, or made unwelcome, by the aborigines. We anticipate that we are to be given a cordial welcome here, having found the beauties and magnificence of these mountain fastnesses of New Hampshire, by one who is a descendant of staunch old New England stock, whose father was largely interested as capitalist and engineer in the development of the Biddeford and Saco water power; who is a successor of Governor Straw, who was a president of this Association for thirteen years, during a portion of which time the present governor was upon his staff. The Granite State is fortunate now in having as its Governor, Henry B. Quinby of Laconia, whom I now present to you. (Applause.)

Governor Quimby's words of welcome were as follows:

It is peculiarly pleasant to me to meet the men associated with the manufacture of cotton, because from my childhood, as your president has said, I was associated with those engaged in that industry and my father had much to do with the projection and erection of the large mills of Biddeford and Saco. As Governor of New Hampshire, it gives me pleasure to extend to you a cordial welcome to our beautiful and progressive State, and I regard it as most appropriate that you have selected this portion of it for the scene of your deliberations, because in this region are the beginnings of those great rivers which flow down to the sea, turning as they flow hundreds of thousands of spindles in Lewiston on the Androscoggin, in Biddeford and on the Saco, and in Manchester, Lowell and Lawrence on the Merrimack.

Here also are the great primeval forests which have for unnumbered centuries stood guard over the sources of our splendid water supply, and which are now in danger from the ravages of the woodsman's axe and the indifference of man.

Our State has realized that in order to protect our water power some action should be taken, and taken early, to conserve our forests, and that while lumbering operations are necessary the intelligent cutting of timber will give adequate protection to the water supply and supply the needs

of the lumbermen as well; and with that idea in view a movement in that direction was made at the last session of our Legislature. Our State should not, however, be left alone in the great struggle for a national reserve covering our mountains and adjacent wooded lands, and New Hampshire earnestly hopes for cooperation by all the States in securing at the next session of Congress the bill which we have so long advocated.

I feel that I should not occupy time that your discussions demand, and I will say in conclusion, may your stay among these everlasting hills be very pleasant and may you carry away with you happy and lasting memories of your sojourn in the Granite State. (Long applause.)

Edwin Farnham Greene responded to the words of welcome of the Governor as follows:

We are pleased to be here. We have returned many times in appreciation of what this beautiful section has afforded for our previous meetings. It is entirely unnecessary for me, and it would be almost trite, to say anything about the beauties and the natural facilities of this section. I am a member of the Cotton Manufacturers' Association, and as such, your Excellency, I am interested in this State as it applies to our own industry. In the first place, your State has done much for the cotton manufacturers. One of the earliest mills was located in this State. The largest cotton manufacturing corporation is also within its borders, and a large and strong Massachusetts corporation has seen fit to come into this State to further enlarge its scope. So in many ways your State has done much and we hope will do much more for our great industry.

There is, however, one point in responding to your cordial welcome, your Excellency, which I would like to make, and that is, our industry is very largely located in New England. I am a New Englander born and bred. The cotton manufacturing industry, although we are a national association, is very largely located within the New England States or in their immediate vicinity. I therefore think it is well for this Association to look with particular interest on anything that will tend to protect the industry and further its growth. I am very glad indeed that the governor of this State sounds the progressive note. Even though I am a New Englander I believe that New England must take care to be progressive. New England has lost much. Several of the great railroads that were formerly controlled by this section have left us,—although the Boston & Maine has not yet done so. I think that New Hampshire, along with the other States in New England, and I think and hope, your Excellency, that you and all that you represent will do all that is possible to further the interests of the cotton manufacturing industry, which today is the great industry of this section. In these days of keen competition and sectional rivalry New England and all that she represents must do much to protect what we have and carry forward to even greater prosperity all that we have developed and all that we hope to develop. We appreciate your cordial welcome, your Excellency, and we appreciate the hospitality which this beautiful section affords. (Applause.)

The President's address was as follows:

President's Address.

CHARLES T. PLUNKETT, Adams, Mass.

For the fifth time, this Association, which has not otherwise duplicated the site of its autumn meetings, now assembles in the heart of the White Mountains amid scenery whose glories awaken the aesthetic sense and whose charm is the infusion of inspiring emotions.

This region abounds in attractions so entrancing, and comforts so alluring, that it would be strange indeed if you and your successors do not continue to assemble here time and again in years to come.

Our meeting in one of the storm centers of national forestry agitation, surrounded by amplest evidences of its wisdom as well as convincing demonstrations of its practicability compels reference to the subject which has already had your hearty support.

In this territory rises the headwater of rivers which turn millions of spindles; furnish the indispensable power factor in the economical production of millions of tons of paper and annually brings millions of dollars to the Granite State.

Here the forest clad mountains and vales conserve the rainfall and maintain the flow of these streams whose waters bestow blessings upon mankind and whose beneficence is shared by all, without distinction of class or vocation.

The agriculturalist is aided in the fertility of the intervales which are not impaired by erosion of floods or the devastation of freshets, as is of such frequent occurrence in countries where the destruction of forests has removed the best of all reservoirs; those provided by the Creator.

Capital is attracted and put to service at the favored spots, where falling water is available to turn the wheels of industries which furnish advantageous employment to thousands of skilled and unskilled people, far beyond the natural supply of the original population and finally, facilities for coast navigation are afforded by these waters at sea level, without the enormously expensive dredging operations so permanently located at the mouths of water courses alternately turbulent and dry.

With a government alive to the interests of its people in other respects, there has been no practical Congressional action toward avoiding the ultimate impoverishment of the people through the wanton destruction of forests such as has already occurred in Spain, Italy and China, whereas by energetic efforts and prompt action similar untoward results have been checked in England, Germany, France, Switzerland and Japan.

Since the United States of America is almost the only civilized government which has no adequate laws upon forest conservation, the belief is surely warranted that it will in this, as it has in other matters, take a commanding position among the great nations of the earth ere the

losses of its rapidly disappearing forests impose well nigh irreparable damage upon the natural resources of the country.

If the music of nature contains supplicating notes which could be interpreted by these noble forest trees in benediction upon the human family, the familiar line "Vote for us" would be their morning and evening song.

Among historical repetitions none are better known than those associated with textile trade conditions. From earliest records, antedating the inventions which resulted in the great aggregations of capital, labor and machinery now constituting the modern manufacturing establishment, the natural law of supply and demand worked as effectively and constantly as in the present day.

The single spindle of ancient spinning wheels with its complement of hand card and loom, as

CHAS. T. PLUNKETT, PRESIDENT, NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

certainly brought its owner to realize the inexorable law as now compels 97 per cent. of European spinners to suspend for months the production of two days per week, which is equivalent in spindleage to that of the entire American mill ownership in full operation.

So disastrous has been the over building in Lancashire during the past three years, that meetings are now being held to discourage the promotion, by speculators and illy informed capitalists, of further undertakings in cotton manufacturing.

These conventions are called and attended by the principal trade organizations of labor and industrial associations, including machinery manufacturers who have large interests in new mills, which although completed, have very wisely deferred operation until consumption has absorbed the surplus stocks of excessive production, completing another cycle in mercantile history.

It is significant that practically all of the workers' unions are actively engaged in this movement and are revealing sagacious leadership which faithfully foresees, and endeavors to forestall, the deplorable results of the long continued idleness of 70,000,000 spindles during one-third of each week; affecting substantially every cotton mill operative in Europe and Asia.

Exact procedure, other than published facts relating to the subject, has not been determined upon and may not be necessary or expedient, since the logic of the situation is so clearly demonstrated in the frank and undisputed statements of all interests, that only ignorance or love of adventure will draw capital to a business, already over exploited because of seemingly phenomenal successes of a comparatively few corporations.

Incidental to the curtailment of output of goods, but of almost equal importance, through its world-wide application to cotton manufacturing, is the influence upon the cotton market. The coincidence of a prospectively undersized American crop, albeit there are supposedly large holdings of old cotton, and the controlled requirements of spinners abroad provides an occasion for universal speculation.

Uncertainty as to quantity and quality of staple will elicit highly illuminated forewords, and trade reports will be put under the giant press to extract the essence of genuine market knowledge, so requisite to balance the scales when they are temporarily tilted by eloquently plausible outgivings of bulls and bears, in and out of the exchanges.

It is unquestionably true that full consumption of cotton at this time, or in the near future, would result in an enhancement of cost to prohibitive figures, and speedily bring the termination of what promised to be an extended period of prosperity in cotton manufacturing and kindred industries.

At this point it becomes my duty to perpetuate the declarations of a long line of distinguished predecessors, whose expressions in superior literary style, have enlivened the pages of the Transactions of this Association and the Conferences of Cotton Growers and Manufacturers at Washington and Atlanta.

Beyond their cogent and truthful statements, which do not in this presence need reiteration or supplement, the only observable result resembles in a pronounced degree that following the agreeable readings of popular fiction. Were it not that elements of real progress are embodied in the gin compressed bale, affording a basis of hope, the report on this semi-annual occasion would be precisely the same as on the preceding eighty-six. If we may hear convincing argument or have bona-fide evidences of actual advancement in these primitive processes, our sojourn here will be gladdened and the resumption of daily tasks undertaken with a vastly greater question nearing solution than that of "aviation."

In making brief mention of manufacturing conditions as remotely and recently noted in European mills, I wish to wholly disclaim pretensions to extraordinary information or knowledge, and observations must be understood to apply in a general sense and not to exceptional mills in either Europe or America.

The American does well to perfect his information as to what his contemporaries are accomplishing in this country, and, out of his wisdom, surpass them if he can; but the assumption that American standards or ideals, at least in industrial activities, are supreme is an act of exaltation and egotism quite sufficient to protect our foreign competitors for ages yet to come.

We are not likely to over-estimate the innate mercantile discernment, mechanical genius and sober judgment of Anglo-Saxons and Teutons, which, be assured, has not suffered deterioration during the present generation. No Yankee nor Southron could have more clearly perceived nor more promptly appropriated progressive ideas than have our European and perhaps our Japanese rivals.

On both hemispheres there are great and small superiorities in management and operation—propriety, however, forbids the enumeration of points in which we apparently excel (that there are a considerable number is unquestionably true), but wisdom commands not exaltation of inherent virtues, but a vigorous grasp of the evident advantages possessed by competitors, whether in the environment of regions supposedly effete and negligible or in the better known districts of western or central Europe. There are no negligible rivals now, and the contest will demand our supremest efforts if in the future we maintain even our present standing in the conversion of an enormous American crop into fabrics upon which the whole world is dependent.

It is indeed true that a handicap of large proportions exists in labor costs, not, however, accurately represented by the disparity of the rewards of labor which in Russia are substantially one-quarter, in Italy one-third, in France and Germany one-half, and in England two-thirds of those prevailing in America. There are some allowances to be made for climatic, temperamental and governmental conditions of a nature adverse to some of the continental manufacturers; while the machinery equipment is generally excellent, and the workers' efficiency gradually improving, as are their home surroundings and standards of living.

To parallel further economies enjoyed by many of our European friends, there will have to be a public sentiment sufficient to secure national legislation tending to permanent rather than transitory industrial conditions now so vacillating in each state and diverse in all. There must be a higher regard for commercial integrity and a moral courage to sedulously nurture it in self and require it of others. A more trustworthy banking capital is an economic factor of considerable importance, a financial support which will not shrink from service at the precise moment of greatest need, in respect of which the Britons and Germans, at least, have a decided advantage.

In management, the observable frugality in reclamation of usable waste fibers is most striking, and calls for more intensive supervision if in this particular we would equal the savings (which are earnings) made by foreign mill officials.

Again, to their credit it must be said, that finer discrimination is made in selection of staples and grades of cotton—a buyer's characteristic rapidly spreading here, where expertness and prudence in this vocation should be unsurpassed.

COTTON CLASSIFICATION.

In making appropriations for the Department of Agriculture for the year ending June 30th, 1909, the act authorized the Secretary of Agriculture "to establish a standard for the different grades of cotton, calling to his assistance for that purpose expert cotton classifiers, by fixing a standard of middling cotton and, using the same as a basis, establishing a standard of nine different grades to be designated middling fair, strict good middling, good middling, strict middling, middling, strict low middling, low middling, strict good ordinary, and good ordinary." The Secretary was further authorized "to prepare in practical form the standard of said grades and furnish the same upon request to any persons, the cost thereof to be paid, when delivered, by the person requesting the same, and certified under the signature of the said Secretary and the seal of his department."

Carrying out the provisions of the act, the Secretary of Agriculture convened in Washington in February a committee of cotton experts, including Messrs. Nathaniel Thayer and Lewis W. Parker as representatives of this Association, the former being chairman.

The committee after due deliberation submitted a unanimous report, which the Secretary has approved, fixing the grades and making certain recommendations in connection therewith. In view of the fact that contracts are made for cotton in advance of the ensuing cotton season, the committee recommended that the grades agreed upon by the committee be not promulgated for general use in trade transactions prior to Sept. 1, 1910.

In order, however, that the cotton trade may become fully acquainted with the grades, the Department of Agriculture will in a short time place sets in the hands of a limited number of associations, organizations, exchanges and agricultural colleges for inspection.

It is estimated that to prepare 500 sets will cost $35 per set, while a demand for several thousand sets could probably be supplied at less than half that rate. The grades are to be put up in a very attractive and substantial manner. The boxes will be 21 inches square and 4 1/2 inches deep, inside measurements, made of the heaviest grade of binders' board, and covered with black cloth. The hinges will consist of two thicknesses of linen glued on. Inside the cover of each box there will be a full size photographic reproduction of the cotton types contained therein as they appear when they leave the Department of Agriculture, each grade being accompanied by a certificate as

to the type of cotton represented, under the seal of the Secretary. Nine such grades will comprise a set, each grade being represented by twelve types.

With the promised types and more complete information, we may reasonably expect at the annual meeting one or more papers by acknowledged authorities on this progressive action of a National department, with the assurance of instructive and profitable discussion.

In this meeting's program, there are papers and reports on subjects which have ordinarily found place in the addresses of Presidents, and it is an indication of progress that such competent writers and committees will contribute their services and superior talents. I assure you that they are appreciated by your present Executive who will not encroach upon their time nor province, but congratulates you that the presentation of matters of large importance will be made by persons who are admirably qualified by experience and practical education.

The following new members were chosen by ballot:

For Active Membership.

John Schofield Boyd, John S. Boyd Company, State Road, Williamstown, Mass.
William B. Gardner, Treas. Nashawena Mills, New Bedford, Mass.
E. Payson Gibbs, Supt. Langdon Manufacturing Co., Stuyvesant Falls, N. Y.
Nathan Hatch, Vice-Pres. and Mgr. Fuld and Hatch Knitting Co., Albany, N. Y.
George C. Hinckley, Vice-Pres. and Treas. Tilton Mills, Valley Falls, R. I.
William C. Kerr, Jr., Treas. Taber Mills, New Bedford, Mass.
Kenneth J. Merrill, Agt. Tilton Mills, Valley Falls, R. I. 12 Maynard St., Pawtucket, R. I.
Joseph K. Milliken, Treas. Mt. Hope Finishing Co., North Dighton, Mass.
John P. Perkins, Treas. Textile Specialties Co., 141 Milk St., Boston, Mass.
Charles W. Praray, Supt. Holmes Mfg. Co., P. O. Box 73, New Bedford, Mass.
Walter H. Underdown, Treas. New Bedford Cotton Mills Corp., New Bedford, Mass.

For Associate Membership.

Henry Fisher, National Ring Traveler Co., Providence, R. I.
Harold C. Hansen, Vice-Pres. and Treas. Draper-Hansen Co., 1 Madison Ave., New York City.
William O. Howland, J. W. Quinham Co., Yates St., Lonsdale, R. I.
Walter S. Newhouse, Counsellor-at-Law on Textiles, 35 Nassau St., New York City.
F. Nathaniel Perkins, Cotton Merchant, 246 Summer St., Boston, Mass.
Theodore R. Plunkett, Standard Mill Supply Co., 30 Park St., Adams, Mass.
Christopher J. Shambow, Shambow Shuttle Co., 297 North Main St., Woonsocket, R. I.
Charles P. Slocum, Corn Products Refining Co., 131 State St., Boston, Mass.

The following papers were read at the sessions, also paper on the Limitation of American Cotton Production as Affected by the Labor Problem in the South, by Theodore H. Price, New York, and Accidents to Cotton Mill Operatives by Edward W. Thomas, Baltimore, Md.

Cork Inserts as Applied to Textile Machinery.

LAWRENCE WHITCOMB, 16 State St., Boston, Mass.

An economical, efficient and almost indestructible means of eliminating losses in power transmission, applicable to nearly every type of friction device used in this great industry, is, I believe, a matter of interest to mill owners, agents, superintendents and others in charge of such works. Leading engineers have repeatedly made the statement in engineering publications that the amount of power lost between its source and the point of delivery, through the slipping of belts and other friction devices, amounts to more than is usually supposed, in some cases running as high as 30 per cent. A reliable and economical method of preventing this loss will unquestionably be of great value.

In old mills, where changes and additions have been made from time to time, such loss of power is particularly noticeable and there an equipment that can be applied in one's own machine shop on Sundays, holidays or out of working hours, and at small expense, has great advantages.

WHAT ARE CORK INSERTS?

Cork is the bark of a tree, known as the cork tree, and is the lightest known solid. It has a very high co-efficient of friction and is not affected by many of the conditions which seriously impair the efficiency of other substances when used for friction surfaces. It possesses a quality not found in any other solid: namely, that of altering its volume to a marked degree under pressure, being compressible and elastic.

Cork is made up principally of an aggregation of minute air cells, having thin, air-tight, water-tight and very strong walls. If compressed, the resistance to compression continually grows stronger, in a manner more like the resistance of a gas under compression than that of an elastic solid, such as a spring.

The elasticity of cork is not only great, but is very persistent. The better grades of corks such as are used in bottling expand immediately when withdrawn from the necks of bottles, and show an increase in volume of about 75 per cent. even after having been confined under compression for many years.

It is the elasticity of cork, coupled with its high co-efficient of friction and its remarkable ability to withstand heat and wear, which make it a valuable material for frictional purposes when used under compression as an insert; but it is a peculiarity of cork that while having much elasticity and

strength when confined under pressure, it is brittle when not so compressed; and the very grade of cork that proves to be most indestructible when used under compression as inserts wholly fails, owing to its brittleness and other peculiarities, if used for frictional purposes in its normally expanded and thus weakened condition. It is this fact that has made its successful use for frictional purposes impracticable until the present method of using it under compression was devised.

To obtain this desired compression, sockets are drilled or cast in the face of a pulley, clutch or brake to be thus equipped, and into these sockets are forced corks of a certain grade and of much larger diameter than the sockets themselves. The corks are allowed to dry and are then trimmed and finished so as to have the right amount of projection above the surface of the pulley, clutch or brake.

The amount of this projection depends on the nature of the work required of the friction surface. There are, however, two distinct methods of construction which I particularly desire to call to your attention because the greatest success in the application of cork inserts to any device is obtained by using them under right conditions and according to approved methods.

ALL CORK CONTACT.

Let us consider first the so-called all cork contact. In this method of construction the sockets are so spaced that the corks occupy a relatively large area and the corks are allowed to protrude above the surrounding surface one-sixteenth of an inch or more so that they alone come in contact with the opposing surface and transmit all the power. This drive is most efficient and satisfactory where power is transmitted by means of a large area of cork used at light pressure, as is customary on the frictions of looms and similar machinery and in certain types of plate and multiple disc automobile clutches. In this service the pressure and the power per square inch of cork are so small that there is practically no wear upon the corks, and hundreds of looms thus fitted have been in constant operation for about eight years without requiring either repairs, cleaning or adjustment.

Cork insert frictions are particularly well adapted for this purpose and many thousands of looms are now so driven and one of the largest builders of looms has recently adopted this type of friction for practically its entire output of friction driven looms, amounting to many thousands every year.

The value of the device for this purpose is further demonstrated by duplicate orders received from mills which have been using these frictions and now invariably specify cork insert frictions on new looms ordered by them.

COMPOSITE CONSTRUCTION.

Second, the so-called composite construction. In this method of construction the corks are allowed to protrude above the surface of the material in which they are embedded but one-thirty-second of an inch as in the case of pulleys, mule-slasher and calender frictions, automobile clutches, street railway brake shoes, etc. This method gives an almost indestructible composite or combination surface of high frictional efficiency and having great wearing qualities. At low and medium pressures the corks, with a co-efficient of friction of say 0.35, work alone, while at high pressures the inserts are compressed into their sockets and the surrounding metal, wood or fiber also comes into engagement to supplement and protect the corks.

Under these conditions the tendency of the cork to yield to compression is greater than its tendency to wear and when the pressure applied overcomes the rigidity of the cork, the inserts are pressed into their sockets practically flush with the face of the pulley or other friction surface in which they are set, but do not lose any of their efficiency, up to their full frictional limit, since they remain in contact with the opposing surface and present the same face area as before they were compressed. This tendency of cork to submit to compression and thus protect itself from wear is undoubtedly the reason for the excellent wearing qualities of combination surfaces in which the corks occupy a sufficient proportion of the frictional surface to render efficiently the service for which they are installed.

Two important facts to be remembered are that it is the compression of the cork in the sockets which causes them to protrude again above the metal, wood or fiber surface in which they are embedded whenever the opposing surface is released, and that the natural physical properties of this material are such that rapid wear is almost impossible.

That cork inserts used under the so-called all cork contact construction have these remarkable wearing qualities, if properly proportioned in area to the load to be carried, can be readily demonstrated.

That cork inserts used under the so-called composite construction will withstand heaviest loads, constant abuse and excessive heat, is shown by their present use in more than 30,000 motor car clutches and by the adoption of this construction by more than sixty automobile manufacturers who, according to existing contracts, will use cork inserts in more than 60,000 new cars in the year 1910.

Having treated the matter rather generally, let us now consider how cork inserts are applicable to the textile industry.

USES OF CORK INSERTS.

Practically all your power is transmitted by means of pulleys driven by belts and I believe it is generally acknowledged that the capacity of a belt of given dimensions is greater than the capacity of the pulleys over which the belt runs; therefore, pulleys having high frictional efficiency are most desirable.

The loss that occurs from the slipping of belts reaches back to the coal pile. The necessity of speeding up an engine 10 per cent. or more, owing to the slipping of belts because of the added load of new machinery, or to keep looms, spinning and

twisting frames or other equipment up to the required speed, means definite waste, while, on the other hand, the failure of certain machines to operate at the desired speed means loss and in some cases a defective product.

To eliminate these difficulties pulleys are lagged and re-lagged, belt dressing is purchased, sometimes in large quantities and to an extent that means an appreciable yearly charge to expense account; and belts are run under excessive tension, to the injury of the belt and with an increase in journal friction far beyond economical operating conditions. If cork inserts are used, such lagging, belt dressing, and excessive belt tension are unnecessary.

Pulleys and friction clutches, from the smallest size to the largest, thus equipped have a friction surface with a high co-efficient of friction, long life and uniformity of action under all conditions of temperature, oil, moisture, etc., features in which they excel all others as may be readily ascertained by the reports of engineers and from technical data available, by inquiries made of parties now using this equipment or, better still, by a direct demonstration in your own mill under your own observation.

That the cork insert pulley exceeds all others in efficiency is shown by tests made by Prof. C. M. Allen, M. S., at the Worcester Polytechnic Institute, a full report of which is too voluminous for this paper, but from which report we copy the following:

OBJECT.

The object of these tests is to compare the relative power-transmitting properties of the various standard pulleys with those of iron and wood pulleys fitted with cork inserts. The standard pulleys used were the smooth iron-face pulley and the ordinary wood pulley.

All of the pulleys were new to start with, but were in prime running condition when the principal tests were made.

The belt used was leather and was kept in good running condition during the test.

The belt speed was about one thousand feet per minute; the revolutions per minute of tested pulley were about two hundred.

The conditions of atmosphere were such as to give a good variety of tests, being made during the months of July and August.

TABLE OF RESULTS.

Load on Dynamometer	PER CENT SLIP. Iron with Cork Inserts.	Iron.
105.0	0.00	1.30
115.0	0.10	1.37
125.0	0.18	1.44
135.0	0.28	1.51
145.0	0.38	1.58
155.0	0.47	1.65
165.0	0.56	1.72
175.0	0.65	1.79
185.0	0.74	1.86
195.0	0.83	1.93
205.0	0.92	2.00
215.0	1.01	2.06
225.0	1.12	2.13
235.0	1.19	2.20
245.0	1.28	2.26
255.0	1.37	2.33
265.0	1.46	2.40
275.0	1.55	2.50
285.0	1.64	2.60
295.0	1.75	2.73
305.0	1.86	2.88
315.0	2.00	3.03
325.0	2.18	3.18

CONCLUSION.

From the average results of over one hundred tests, the iron pulley with cork inserts at a point of 2 per cent. slip (which is considered allowable in commercial practice) shows an increase in its power-transmitting capacity of 51 per cent. over the plain iron pulley.

Respectfully submitted,
(Signed) C. M. Allen.

Subsequent to the above reported test it was deemed advisable to make a test of the relative efficiency of several types of small high speed motor pulleys and again tests were made by Prof. Allen. The pulleys were all five inches in diameter with three-inch face and were:

(1) Cast Iron.
(2) Cast Iron with Cork Inserts.
(3) Fiber Faced with Cork Inserts.

Worcester, Mass., Oct. 19, 1907.
National Brake & Clutch Co., Boston, Mass.

Gentlemen: Below you will find table of results showing the relation between slip in per cent. and horse-power transmitted by the various pulleys tested by me. This table was made up from the curves on enclosed sheet according to your request.

Respectfully submitted,
(Signed) C. M. Allen.

PER CENT. SLIP.

Horse-power.	Cast Iron.	Cast Iron and Cork.	Fibre and Cork.
1	0.23	0.217	0.155
2	0.46	0.43	0.310
3	0,70	0.65	0.465
4	0.95	0.86	0.620
5	1.20	1.085	0.775
6	1.50	1.30	0.930
7	1.85	1.55	1.085
8	2.35	1.80	1.240
9	3.35	2.10	1.395
10		2.43	1.55
11		2.85	1.72
12		3.40	1.90
13			2.12
14			2.35
15			2.70
16			3.18
17			3.95

As certain parties in Lowell, Mass., wished to have a demonstration of the comparative efficiency of cork insert pulleys and pulleys not so equipped and did not care to rely on the laboratory tests reproduced in part above, it was decided to run a series of tests at the Lowell Textile School and

to invite agents, superintendents and others interested to participate in these test.

I submit the following extracts from the report in order that you may know the results obtained without the necessity of sending for a full report.

REPORT OF PULLEY TESTS

Made at the Lowell Textile School, Lowell, Mass., by G. H. Perkins, S. B., Head of Engineering Department.

OBJECT.

These tests were made to determine the relative efficiency of various types of commercial pulleys both with and without cork inserts and were conducted in the engineering laboratory of the Lowell Textile School.

The conditions were as nearly as possible those of actual practice and the greatest care was observed in maintaining them throughout all tests.

The pulleys and belts were new and clean but were run for a few weeks in preliminary trials before beginning the final tests. No dressing or preparation of any kind was applied to the surface of either pulleys or belt.

The pulleys tested were all eighteen inches in diameter, six inches face and were of the following types:

"A" Wood Rim Pulley.
"B" Wood Rim Pulley, with Cork Inserts.
"C" Wood Rim Pulley, lagged with Leather.
"D" Steel Pulley.

The initial belt speed in all tests was about 1,560 feet per minute, and the initial belt tension was approximately 50 pounds per inch of width of belt.

RESULTS.

The comparison of power transmitted at 2 per cent. slip which is considered a commercial allowance is given in the first column of the following table:

Type of Pulley.	H. P. at 2 Per Cent. Slip.	Maximum Horse Power Transmitted.	Slip in Per Cent. at Maximum H. P.	Relative Value 2 Per Cent. Slip.
Wood Rim Pulley with Cork Inserts	11.8	13.2	4.6	100 per cent.
Wood Rim Pulley, Leather Lagged	8.7	12.4	4.7	73 " "
Steel Pulley	8.3	12.7	6 0	70 " "
Wood Rim Pulley	7.8	9.6	4 3	65 " "
Percentage of Gain of Wood Rim Pulley with Cork Inserts over same without Inserts				51 " "
Percentage of Gain of Wood Rim Pulley with Cork Inserts over Plain Steel Pulley without Inserts				42 " "
Percentage of Gain of Wood Rim Pulley with Cork Inserts over Leather Lagged Pulley without Inserts				35 " "

Other tests were made which would indicate that the percentage of gain for the cork insert pulleys under conditions of less belt tension than that maintained throughout these tests would be even greater than shown above.

The result of these further tests will be given as soon as sufficient data can be obtained from additional tests which will be made as soon as the School is opened in the fall.

(Signed) G. H. Perkins.

Copies of the report of the tests above referred to may be obtained at any time.

The several reports from which these quotations are made show that main driving pulleys, receiving pulleys and motor pulleys, together with loom, spinning and twisting frame pulleys and in fact, all pulleys which may be overloaded or on which slipping may occur, will yield better service if equipped with cork inserts than otherwise.

At the present time the least expensive method of using cork inserts in pulleys twelve inches in diameter and over, is found in the wood or wood rim pulley in which sockets for the inserts are easily and quickly bored.

Both wood pulleys and wood rim iron arm and hub pulleys now in use may be equipped with cork inserts in the machine shops of your mills at small expense by obtaining the necessary directions and authority.

New wood rim arm and hub cork insert pulleys in any size may be purchased at reasonable prices.

New cast iron pulleys to be thus equipped require a rim not less than one-half inch in thickness, and spinning and twisting frame pulleys now being made for new machines are being so constructed.

Cast iron pulleys now in use on spinning and twisting frames and similar machinery having thin rims may be backed with hoops of wood one-half inch in thickness prepared especially for this purpose; sockets may be then drilled through the iron and into the wood backing, and corks inserted at small cost, thus doing away with the necessity of discarding your existing equipment.

Cast iron pulleys can also be covered with a flexible fiber or lagged with leather and the corks inserted in the lagging.

At a later date there will be placed upon the market a steel pulley equipped with cork inserts which will supply an inexpensive cork insert pulley that may be used to advantage in places where wood pulleys are not considered suitable, and in this connection I submit the following:

Lowell, Mass., August 11, 1909.

Gentlemen: Complying with your request for the results of the recent tests on steel pulleys conducted at the laboratory of the Lowell Textile School, I beg to submit the following report.

The two pulleys which were tested were as follows:

No. 1. Steel pulley 18 inches by 6 inches, with cork inserts in the rim applied as per the invention of Lawrence Whitcomb U. S. Letters Patent, May 18, 1909. This construction enables cork in-

serts to be used economically and effectively in the common types of commercial steel pulleys and increases their frictional efficiency without impairing their lightness and strength. The corks were 1 inch diameter and 3 1/2 inches on centers.

No. 2. Steel pulley 18 inches by 6 inches with plain rim.

The apparatus and conditions under which these tests were made were identical with those described in the report of pulley tests already submitted to you.

The summarized results of all tests made on these pulleys are as follows:

Type of Pulley	Horse Power at 2 Per Cent. Slip.	Maximum Horse Power Transmitted.	Slip at Maximum Horse Power.	Relative Value at 2 Per Cent. Slip.
No. 1 Steel Pulley with Cork Inserts	13.3	14.5	3.6 per cent	100.0
No. 2. Steel Pulley plain	8.3	12.7	6.0 " "	62.5

These results show the gain in efficiency of the steel pulley No. 1 with cork inserts to be 60 per cent. over steel pulley No. 2 with a plain rim under like conditions of slip.

The maximum power to which the tests were carried was 14 per cent. greater with No. 1 than with No. 2, and this with 40 per cent. less slip.

Trusting this will give the information desired, I remain,

Very truly,
(Signed) C. H. Perkins,
Head of Engineering Department,
Lowell Textile School, Lowell, Mass.

MULES.

Many leather faced mule friction cone clutches are being equipped with cork inserts under the composite method of construction above described, thus providing a clutch which is almost identical with that used in automobiles.

The result of this equipment is the elimination of excessive slipping and the consequent wear and burning of the leather facings. This means greater efficiency and far longer life, thus doing away with the trouble and expense of frequent renewals.

LOOM FRICTIONS.

While it is true that at the present time a large proportion of cotton looms are driven by means of tight and loose pulleys, we are informed that a considerable portion of the heavier looms now being ordered are to be driven with the modern flat faced friction used so extensively on woolen and other types of heavy looms, owing to the quicker pick-up and other advantages incident to this construction.

To enable loom manufacturers to apply these friction surfaces to their new looms and to enable mill owners to replace worn and unsatisfactory leather facings, the so-called "Ready-to-Use" cork insert ring, now in use on many thousands of looms, was devised, and these rings are carried in stock by leading loom manufacturers and in the stockrooms of many mills for immediate application when required.

The relative efficiency of a cork insert friction as compared with a leather faced friction is clearly shown in the report of a series of tests made by Professor Allen at the Worcester Polytechnic Institute for the Crompton & Knowles Loom Works, quotations from which report follow:

REPORT OF TESTS ON LOOM CLUTCHES.

Gentlemen: I beg to submit herewith results of comparative tests made upon two types of loom clutches as furnished by the Crompton & Knowles Loom Works, of Worcester, Mass. The face of one clutch was covered with leather, the other was inserted with cork.

The accompanying table gives the actual results and shows plainly that the cork insert clutch has less tendency to slip under the same load and with the same pressure upon the faces of the clutch than the one with the leather face; or, in other words, the cork-inserted clutch will transmit more power than the leather-faced clutch under the same conditions.

As seen from the table, the cork-inserted clutch is capable of transmitting about twice as much power as the leather-faced clutch, with the same total pressure on the faces of each clutch; or it may be stated that with each clutch, transmitting the same amount of power, about one-half as much pressure is required in the case of the cork-inserted clutch as in the other.

(Signed) C. M. Allen.

COMPARATIVE TESTS OF LOOM CLUTCHES.

Position of Clutch	Pressure on Clutch.	Torque Cork Insert Clutch.	Leather-faced Clutch.
Average results of eight positions	89.5 lbs	19.50	16.95
" " " " "	151.5 "	34.20	17.66
" " " " "	213.0 "	46.43	23.09
" " " " "	275.0 "	57.05	29 46
" " " " "	337.0 "	73.33	36.09
" " " " "	398.0 "	82.24	41.31
" " " " "	460.0 "	96.48	47.56

orque measures in pound feet.

Test made by C. M. Allen,
Worcester Polytechnic Institute.

SLASHER AND CALENDER FRICTIONS.

Owing to the presence of oil, the heavy duty required and the heat generated by excessive slipping slasher and calender frictions are quickly

rendered inefficient, necessitating frequent and expensive renewals.

Owing to the conditions met with in this service, the composite cork insert construction above referred to is used in slasher and calender frictions which are made of bone fiber in all required sizes, giving constant and uniform service for long periods.

Fiber, rubber and leather slasher and calender frictions now in use, which have failed to give satisfactory results, may often be equipped with cork inserts in one's own mill at a nominal expense and be again put into service with greatly increased efficiency and durability.

The service required of these frictions is similar to the severe use to which automobile clutches are subjected, in which use tens of thousands of cork insert clutches have given superb results.

CORK INSERT WASHERS.

Cork insert washers, ranging in size from those used on quilling machines which are about one inch in diameter, up to heavy drawing washers eight inches in diameter, are made with the right amount of cork area to give any required drag.

These washers have very decided advantages over the ordinary felt washers in that they are not affected by oil, water, dust or atmospheric conditions and, therefore, give constant and uniform results at all times.

In closing I desire to say that in preparing this paper it has been my aim to present the principles involved in the successful use of cork inserts rather than enumerate all their possible applications; and if the matter now brought to your attention, perhaps for the first time, leads you to adopt cork inserts for any of the purposes described or to apply these principles to any of the many other frictional devices not herein referred to, in either event enabling you to overcome existing difficulties, I shall feel that it has not been written in vain.

Secondary Textile Education.

WILLIAM H. DOOLEY, Principal Lawrence Industrial School, Lawrence, Mass.

Almost all the institutions in this country which provide textile education aim to be of collegiate rank. They provide a training for students over sixteen or seventeen years of age, who have had a high school education or its equivalent. The same courses are provided evenings for those working days in the mills. The education received in these schools is the highest possible training in textile arts. This education and training often exceeds the real educational needs of the positions in the ordinary mill. Little if any effort is made by the present schools to supply textile education of a secondary grade, that is a simpler textile education to the great mass of young people between fourteen and seventeen years of age who desire a practical education, and evening or part time instruction to those working in mills who desire instruction to meet their daily needs.

This one-sided educational scheme is due to the tradition that one must have a cultural before a technical education and to the circumstance that at the time of the origin of the textile schools, they were patterned after the existing technical schools which were all of collegiate grade.

Within the last generation, since the technical schools of college grade were established, a great change has taken place in our industrial world. On account of lack of labor and keen competition, labor-saving machines have been invented in great numbers, and there has been a tendency to specialize. In fact specialization is the keynote of industrial life. As a result of the great change in organization of industries the manufacturer has done away with the apprenticeship system, and the unpaid hand is repugnant and a nuisance to the manufacturer. Even the privilege of visiting large mills is denied to classes in technical schools because the visit usually interferes slightly with the workers.

To show the extent of specialization let us follow the history of the ordinary operative. A boy or a girl that applies for a position at a mill is given some work at a machine or in some part of the shop or mill. He works on this machine or does this kind of work day in and day out. The division of labor is carried to such an extent that the work is merely an operation. As a result of performing this operation day after day it becomes a habit, and he does it without much mental effort. He begins and leaves work at the stroke of the bell when the machinery moves and stops, and really becomes a part of the machine.

If an ambitious boy—and there are a great many of them inside the mill-gates—has a natural curiosity for information about the processes that precede or follow his own operation, the machine he tends, or the power that drives the machine, or the simple ordinary calculation used in figuring speeds, drafts, etc., he has little opportunity to see, and if he asks about what little he sees the second-hand or older worker will tell him to "find out the same as they did." The whole atmosphere around the mill is such as to stifle the propensity of young people to know. If the boy desires to change to another department in order to learn the different processes, the overseer will refuse him because he is most useful in his present position.

The outcome of the boy spending the best part of his life, from fourteen to twenty years of age doing this work which requires little thinking after the first few days, and no systematic training outside of the mill, as a part time system, one week in the mill and the next week in the school, would give, he is apt to lose the power of initiative and the habit of thinking he so often used in his school-days, and loses interest in his work, and knows less than when he left school. It is clear to one it is difficult to get a thorough knowledge of any branch in the mill under the present organization. This organization has come to stay.

Herein lies the needs of a school to provide systematic training in our great mill centres to the boys and girls between from fourteen to seventeen which will enable them to see the great industrial opportunities and to appreciate the broad principles, and simple operations of the great textile industry, and supply the information and

training that the present organization of the industry will not allow.

The writer does not mean to speak slightingly of the present textile schools of college grade, for they have a distinct aim; to train the highest class of experts and manufacturer's sons, and they are doing this work better than ever before. But there is a great need of a school of lower rank parallel to our existing high schools, providing day instruction for boys and girls between fourteen and seventeen, often called secondary education, and evening or part time system to meet the daily needs of the operative. This school should be free and supported by taxation, for secondary education has for a number of years been supported by public taxation. This school would not overlap our present textile schools, for it would take the boy who is mechanically inclined, between fourteen and seventeen, who cannot afford to remain unproductive until twenty-one, or to pay the tuition fee to the higher textile schools. It would not even interfere with the high school whose aim is to provide education to children academically inclined.

For several years I have been deeply impressed with the need of secondary technical education in textile manufacturing, and two years ago, while instructor in the Lawrence High School, I resolved to find an opportunity to put my ideas into effect. In the course of my inquiries I happened to meet Samuel S. Dale, editor of the Textile World Record, Boston. After listening to my explanation of the plan, Mr. Dale stated that it was just what the textile industry needed, and he urged me to establish such a school at Lawrence, as all the conditions were favorable at that place for the experiment. I acted on his suggestion, and found, not only that Lawrence needed such a school, but that it could be started, with but slight expense, by occupying some unused buildings belonging to the city, and using as a nucleus a small school conducted by the loom fixers' union. As a result a school for secondary technical education has been in existence in Lawrence for the past two years.

Like all new movements it had many obstacles to meet. Prominent business men believed in the school, but were afraid that the city could not stand the expense of equipping such an institution. The trade unions were opposed to the school because they believed it was a manufacturers' scheme to flood the market with help and break the unions. On account of the limited knowledge the public had of industrial education it was difficult to arouse public sentiment.

In order to overcome all opposition the school was started in the Loomfixers' Hall as an evening school for those already engaged in the trades. Classes were formed in loomfixing and calculations, mill arithmetic, textile designing and cloth calculations. The writer gave his services free as an instructor in mill arithmetic, and in order to make the work practical, placed question boxes around the school-rooms so the problems and questions would come from the operatives in the mill who were attending school. The school was a great success from the beginning and the attendance increased to such an extent that it became necessary to provide new quarters.

The school was then taken over by the city and established under the Industrial School Act allowing "cities and towns to establish industrial schools under Boards of Trustees" the state reimbursing the city to the extent of one-half for cost of maintenance. By the provisions of the law, the school has three distinct functions: First, that of offering to children who have reached the age limit of compulsory education in the grades a further education which aims to prepare them to go into some form of industrial occupation as the High Schools prepare them for professional work or the commercial schools for that part of business technically known as distribution.

Second, to offer to those already at work an opportunity for further study which will aid them to become more efficient workers, and aid them in advancing in their line of occupation.

Third, if deemed expedient, to offer to young men already employed, part time instruction in which the employer gives the time out of the working-day.

This school, so far as planned, is meeting the first two provisions of the law, leaving the question of part time work until some specific request should come from some manufacturer.

It naturally falls then into two general departments, that of day work dealing with persons over fourteen years old, but do not work, and the evening work dealing with persons already employed.

COURSES OF STUDY.

1. Textile Arts—Boys.

First Year.—Business English, mill arithmetic and manufacturing bookkeeping, industrial history, mechanics and electricity, raw material, carding and spinning, weaving and warp preparation, designing.

Second Year.—Business English, mill mathematics and manufacturing bookkeeping, industrial chemistry, industrial history, carding and spinning, weaving and warp preparation, fabric analysis and designing.

Third Year.—Business English, mill mathematics and bookkeeping, industrial chemistry, industrial history, carding and spinning, weaving and warp preparation, fabric analysis, designing, dyeing and finishing.

2. Mechanical Arts—Boys.

First Year.—Shop and business English, shop arithmetic and manufacturing bookkeeping, industrial history, mechanics and electricity, study of wood and iron and the processes they pass through, blue print reading and machine sketching.

Second Year.—Shop and business English, shop mathematics and manufacturing bookkeeping, industrial history, mechanics and electricity, mechanical drafting, machine sketching, study of the processes of iron.

Third Year.—Shop and business English, shop mathematics, industrial history, mechanical drafting, machine shop practice.

3. Domestic Arts—Girls.

First Year.—Business English, practical arithmetic and bookkeeping, industrial history, dressmaking and dressmaking designs.

Second Year.—Business English, practical arithmetic and bookkeeping, industrial history, dressmaking, cooking and millinery.

Third Year.—Practical and business English, business arithmetic, industrial history, dressmaking, millinery.

The day industrial school gives a practical education to children who are obliged to work in either the industrial or commercial occupations at a period of life when the training they receive determines their future usefulness and will include:

1. Children whose parents now send them to high school and who are mechanically inclined, and who do work in the classics and literary branches very poorly, but who can be educated best along the line of practical education.

2. Children whose parents do not feel that they can afford to give more time for purely academic work, yet would feel they could afford a child a further education if it would aid him or her in getting started in life in some industrial branch with a training. This class would include a great many children in the grammar grades who do not like bookish work, and have advanced in years and training beyond grade work.

The school provides for mental as well as mechanical education, but it intends to always recognize the fact that its graduates must meet the needs of the textile and mechanical industries and that they will be expected to make good and develop ability in mill and shop life.

Hence the point of view is not that of the high or even the manual training schools which aim to prepare for college or higher technical institutions. What the school teaches will aid the pupil in meeting actual mill conditions efficiently. On the other hand, it does not propose to turn out graduates capable of doing journeyman's work in any specific branch, so that it differs from a trade school.

It gives a training in the simple operations and processes of mill work, and in addition a knowledge of business English, industrial life and the applied sciences and in this way the opportunities of modern industrial life will be open to him. It is for the child who wants to see and know the use of things, who is of a practical rather than an academic mind.

The course of study is planned that the work of each year is, so far as it goes, complete in itself, that nothing is taught on the theory that it will be of value in some later period in the course. To illustrate in the textile course, raw materials, carding and spinning, weaving and warp preparation, and designing are taught in the first year. That does not mean that the textile course is presented in the usual school course of spending all the first year on carding but rather give the simple elementary part of each of these branches and in the second pursues the work a little further and in the third year go as far as it is possible. In this way at whatever place the pupil leaves school he will have had, up to that time, the best preparation which the school could give. He may pursue the subject beyond that point in the evening course.

The school workshops and mills are conducted on a commercial basis, and pupils are taught not to be extravagant with the materials provided for practice.

The department of evening work is devoted to the education of the operative. Education adapted to meet the daily needs of the industrial worker is coming to be as important as the education of the child.

We should bear in mind that the average length of a boy's school life until recently was only about four years, and that was before he was twelve years old. Then again we are not sure that he received this amount of education, as no systematic method was adopted until recently to keep the boy at school. Consequently these boys who are now the industrial workers, have received little if any more, education than that obtained during these four years.

There is accordingly a large demand growing out of every day needs for educational opportunities not afforded by one existing public school system. A demand made by those deficient in early education who are desirous of making up this deficiency, and by those who seek to supplement their acquired skill with technical training that will lead to advancement and increased power.

There is no question but that the most ambitious workers in every industry will take advantage through evening or day study of every opportunity of securing a practical education. The success of the classes of the Young Men's Christian Association, the textile schools, and the correspondence schools bear witness to this statement. In the city of Lawrence, before the industrial school opened, over one hundred and forty workers traveled eighteen miles to attend the evening sessions of the Lowell Textile School, going directly from the mill, and deferring their evening meal till they returned home at midnight.

In the same city over 2,000 workers are enrolled in the correspondence school, paying from $10 to $100 for a course. The following statement shows how unsuccessful and difficult instruction by correspondence is, the International Correspondence School having admitted in an article in the American Machinist that but 2.6 per cent. of the students have been awarded a certificate or diploma. The vast majority of men enrolling are soon discouraged, and frequently lose faith in their work.

The question may be asked: are not the existing public evening elementary and high schools meeting the educational demands of the workers? In order to enter our present evening high or what few evening technical or textile schools there are, the applicant must be a graduate of a grammar school or pass an examination equivalent to the work in the ninth grade. Very few of our industrial workers are graduates from the grammar schools, and those who have not graduated cannot pass the entrance examinations.

Another reason why they do not appeal to the working class is that the instruction in both the evening elementary and high schools usually draws

a large number of people who are relatively young, that is, boys and girls from fourteen to fifteen up to twenty-five. Older mechanics and mill workers, who may perhaps have some reputation in their trade, and who wish to perfect themselves in certain technical lines, do not wish to be grouped with persons of that age, feeling that such persons, having come recently from the public schools, are able to answer questions better, use better English, and appear to better advantage than their older associates. Mature men are often sensitive about the comparisons, which the younger members of the class are apt to make at their expense.

A third reason was that the textile and technical schools usually aim at teaching a subject quite systematically and modeled (possibly too much so) after the day school. Industrial workers have intensely practical aims when they come to an evening school and are unwilling to study systematically an entire subject; they demand that the instruction shall lead directly to the specific things which they want to know.

If they are put into classes in which they are obliged to spend a month or more in preliminary work, the value of which they do not immediately discover, they will not attend.

The purpose of most of our evening technical schools is to give not only the highest possible instruction in science, but the application of this knowledge to the operations of industry. The evening courses are the same as the corresponding day courses. What is needed is a school lower in its entrance requirements, and giving simple instruction of a character more directly vocational or concerned with the daily needs of the industry.

This idea has been carried out in the Lawrence School where the problems, drawings and notes are the problems, drawings and notes from the mill and shop, so that the school always keeps in touch with the industries. The problems are obtained by a question box placed in the mills and schoolrooms. Special text-books are used, edited by the instructors. The instructors are practical working-men, in the industries, are conversant with the needs of the operatives.

Every student attends an evening course with a definite aim in view. So our evening instruction appeals to the student immediately at the beginning of his work the very first evening.

The instruction in the various branches of mathematics are adapted to meet the needs of the mill operative, the machinist and the steam engineer. The terms used in the class-room savor of the shop and mill. For example, how to find the heating capacity of a boiler does not appeal to the weaver in the mill. On the other hand, how to find the size of a pulley for a certain loom does not awaken the interest in the steam engineer as much as the problem involving the same operations dealing with a problem in the boiler room.

All our students are classified into vocational classes according to their trades. For example, there is a class in arithmetic for engineers and a class in the same for boiler firemen. Again, the textile designers have class in arithmetic called cloth calculations. This idea carries out the plan of the old workingmen's guilds; each guild was formed for purpose of social intercourse and mental stimulus, each trade having its own guild. The daily trade experiences of each member become the property of all members. Discussions relating to the practice of their chosen trades occupied their attention. So today workingmen have common trade interests. Our evening students are grouped according to their occupations, and this way have an opportunity to talk over these interests.

The teacher acts as a leader and draws out the students in telling their trade experiences, and through the expression of these various opinions the practical solution of the particular problem at hand is obtained. It is difficult to get students to recite and express themselves at the blackboard. A free discussion of the point at issue makes the student lose his self-consciousness, and before he is aware of it he is at the board illustrating his particular method of solution. Of course, such discussions are under the guidance of the teacher.

Provisions are made for students who cannot attend but once or twice a week. It is quite common for students to stay away because they cannot attend regularly. This applies to a great many textile workers. In prosperous times the mills run evenings, and the employed are expected to work overtime. But they can usually get away for one night in the week during such times. They cannot tell definitely what nights they will be called upon to work. Students who are working overtime are allowed to attend any night during the week after the work is fairly started. Such a plan is feasible. Boiler firemen alternate in working day and night. A fireman who works days this week will work nights next week, and so on. The week he works nights he attends the day classes, and the next he attends the evening classes.

In a word, every effort is made on the part of the instructors to accommodate the changing time schedule of the individual student, and to awaken within him that self-interest in the progress of his school work, which will enable him to do the very best of which he is capable.

Committee on Standard Specifications for Staple Gray Goods. (Third Report.)

The result of your committee's work and its recommendations, approved and adopted by this Association last April, were, one month later, approved by the American Cotton Manufacturers' Association at its annual meeting held in Richmond, Va. Both bodies are now definitely on record as approving the work that has been done and urging its use by the trade.

Since its second report, made at the annual meeting in Boston last April, your committee has made such modifications in the form and details of its proposed Sale Note and "Allowable Variations," as have been found desirable for practical use. The committee has also devoted consider-

able time to fostering the adoption of the Sale Note by the trade.

In June, a meeting was held in New York City between representatives of leading New York brokers and commission agents, and members of the Uniform Contract Committee of the American Cotton Manufacturers' Association, and this committee.

Whereas that meeting was not as largely attended and thus not as helpful as had been expected, it did bring out clearly that uniformity in sale notes and trade customs covering the sale and purchase of cotton goods in this country would be very desirable; also that some body or bodies of influence, such as the American Association and our own, must take the initiative in the movement to bring about these desirable results. No individual working alone could expect to satisfactorily cope with the problem. It seems to your committee that the proposed Sale Note, with its simple and equitable legal conditions and "Allowable Variations," should gradually be adopted by the trade, or at least become the basis of operations in this country, backed as it now is by the foremost cotton manufacturing associations.

As the principal part of this report, we attach hereto a copy of a proposed form of Sale Note, as finally revised and amended by your committee, which has been submitted to the Board of Government for its endorsement, in accordance with the vote of this Association passed at the annual meeting last April. Whereas this particular form is made out for use by a broker, your committee again calls attention to the fact that, with a change of a word or two, it is equally adapted for use by others. This Sale Note form your committee is disposed to submit as its final report. Modifications in the form and in details will undoubtedly have to be made when found necessary by practical use and as trade conditions change; but to what extent this Association should continue its connection with this work, your committee respectfully defers to you for determination.

Attention should be called here to the action taken by the American Cotton Manufacturers' Association in May, when adopting the report of its committee on a uniform contract for gray cloth, in appointing a committee to study and propose similar regulations for use in the cotton yarn trade. The necessity for some such standard was clearly brought out by the discussion at that time, indicating for instance, a considerable difference of opinion as to the weight limits within which yarn should come. Your committee suggests the appointment of a committee to consider the subject, feeling sure that no harm, and possibly great good, to the cotton yarn trade of this country would result from the study and standardization of yarn variations and contracts.

Your committee is pleased to report that less than half of the appropriation originally made by the Association for this work has been expended, the total expenses of the committee to date being $661.24. About half of this total has gone to the committee's counsel, for whose painstaking and valuable assistance, and moderate charges we are very grateful.

The Cotton Manufacturers' Uniform Sale Note is now in actual use in the trade, transactions having been made with it, and the extent of its use will rapidly increase.

(Form approved and adopted by The National Association of Cotton Manufacturers and American Cotton Manufacturers' Association, of 1909.)

CONTRACT SALE NOTE.

Number .....

Sold for account of .....

To .....

Quantity: .....

...yards (variation not to exceed 2% allowed)

.....pieces of ..... yards each

.....bales of ..... yards each

In addition, buyer to take and seller to deliver if made:

% Seconds at .....

% Tailings at stated contract price if contract is not renewed.

Quality: .....

Time of Delivery ..... from date hereof. (Delivery within two days before or after times specified above is allowed.)

.....during each week, commencing week ending .....

.....during each month, beginning in the month of .....

Count per inch: Warp ..... Filling .....

Weight ..... Yards to the pound.

Width in inches: .....

Price ..... Cents per yard.

Terms of payment:

Net ..... days from date of delivery.

Net ..... days from date of delivery less .....% for payment within ..... days from date of delivery.

Place of delivery:

F. O. B. to carrier at ..... with ..... freight allowance.

F. O. B.

Special conditions: .....

Shipping instructions: .....

If the production of the seller shall be curtailed during the time above named, by strikes, lockouts, or unavoidable casualties, the deliveries shall be made and accepted in proportion to the production.

The provisions of paragraphs I, II and III, and the allowable variations from specifications as adopted by The American Cotton Manufacturers' Association and The National Association of Cotton Manufacturers, all as printed on the back hereof, are accepted and agreed to as a part of this contract, unless otherwise stated herein.

This sale note is the entire contract between the buyer and seller, and any alteration in or changes from the printed form of this contract must appear on it in writing.

To ..... Broker.

Paragraph I.—Passing of Title on Delivery. Unless otherwise specified, the title to goods sold passes to the buyer (subject to the right of stoppage in transitu):—

a. Upon delivery F. O. B. to carrier, consigned to buyer, and thereafter goods are at buyer's risk.
b. Upon arrival of goods at destination and delivery to buyer of bill of lading or of goods, in the case of goods to be delivered F. O. B. elsewhere than to carrier.
c. Upon delivery of indorsed bill of lading or of goods, in the case of goods consigned to seller's order.
d. Upon the separation of the goods and holding subject to buyer's order (the invoice to follow by due course of mail), in the case of goods to be held or if buyer fails to give shipping instructions.

Paragraph II.—Free Storage. Sixty days' free storage allowed on goods invoiced and held, the same to be at buyer's risk but to be covered by fire insurance effected by seller in reputable companies.

Paragraph III.—Rejections and Claims. The buyer cannot reject the goods for delay in delivery unless he notifies the seller within two business days from receipt of bill of lading, or of invoice if goods are to be held. When contract calls for delivery in instalments, the buyer cannot cancel the contract for any default in any one or more instalments not amounting to a substantial breach of contract.

Buyer cannot reject goods for defects in quality or other like defaults (a) if he cuts or converts them, nor (b) unless he notifies seller within thirty days from receipt by him or at finishing works of goods not held, or within thirty days after expiration of period of free storage if goods are invoiced and held; nor (c) unless such defects amount to a substantial breach of contract.

Loss of right to reject does not deprive the buyer of his right to claim damages, if any; but no recovery shall be had on any claim not made within one year from receipt of goods or beginning of period of free storage.

* * *

ALLOWABLE VARIATIONS FROM CONTRACT SPECIFICATIONS.

Width: The width shall not vary anywhere by more than 3/8 of an inch below the stipulated width, nor more than 5/8 of an inch above. The width shall not be uniformly less than the stipulated width, but must, at least in some places in each piece, be equal to, or greater than, the stipulated width. Goods shall be measured at right angles to the selvages when laid open on a flat, horizontal surface and smoothed out by hand, but not stretched.

Warp Count: Except within four inches of each selvage (where the count must approximate that stipulated), the number of warp threads per inch shall not vary anywhere by more than one thread per inch below the stipulated count, nor by more than two threads per inch above. The number of threads per inch shall not run below the stipulated count throughout the piece, but must at least in some places in each piece, be equal to, or more than, the stipulated count.

Filling Count: The number of threads in the filling, or weft, shall not vary anywhere by more than three threads per inch below the stipulated count, nor by more than four above. In the case of sateens, however, when the count of filling exceeds the count of warp, the allowance for variation above specified shall be increased by the same percentage that the filling count exceeds that of the warp count. In any case the filling count per inch shall not run below the stipulated count throughout the piece, but must, at least in some places in each piece, equal or be more than, the stipulated count.

Weight: Goods shall not vary from the stipulated weight on either side by more than 4 per cent. in any one piece, or 2 per cent. in the average of any bale or roll. In case of controversy regarding the weight of goods, decision shall be based on goods which have been exposed for 24 hours to normal atmospheric conditions approximating a temperature of 70° F. and a humidity of 70 per cent.

The word piece, as used above, refers to a length of about 50 yards.

Reinforced Concrete for Textile Mill Construction.

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The purpose of this paper, in so far as is possible, is to clear up some of this misapprehension —not by entering into a discussion of the history of concrete, nor into the theory of its calculation and design,—but by taking up a few of the points which are most frequently raised by owners, architects or engineers interested in the construction of new mills. When concrete was first being introduced as a building material in this country, one of the chief difficulties confronting its sponsors was the fact that they had to ask the owner with whom they were negotiating to accept their statements as to the worth of the material almost wholly on faith.

Vibration is probably as frequently discussed by the textile world as any other phase of industrial procedure. Its effect upon mill buildings has been most carefully studied, and its cure or at least its partial elimination sought. Among the mill interests there seems to be a strong feeling that vibration is the one reason why reinforced concrete is not serviceable for their buildings; among practically all other industrial executives, vibration is generally considered the chief factor in influencing them to use concrete. The majority of owners of concrete plants are well satisfied that they get less vibration with this kind of construction than with any other type of building. Is the vibration of a textile mill so much worse than that in other factories that a structural material, which has been so uniformly successful as has concrete, is not to be trusted?

The Robert Gair Co., manufacturers of paper goods, have a large plant in Brooklyn, N. Y., consisting of two six-story brick and first class mill construction buildings, and one nine-story and basement reinforced concrete factory. All three structures are filled with the heaviest presses, cutters, embossers, etc.,—every type of the latest paper making machinery. The vibration in the mill construction buildings is such that a plumb-

bob hung parallel to any one of the walls will sway to a considerable extent; in fact the buildings show that it would be difficult to produce more severe vibration than they are subject to. The reinforced concrete structure directly across the street, subject to the same conditions of foundations, loads, vibration, etc., is remarkable for its rigidity. This building measures 231 feet by 200 feet 6 inches and is nine stories and basement, having 10 acres of floor space.

These presses operate rapidly and have very heavy reciprocating parts, yet a coin can be stood on edge anywhere on their base frames and it will remain in position as long as left there, which is a fair test of the vibration—this being on the seventh floor of the building. All through this great factory one may lay his hand against a column and feel scarcely a tremor. The saving in such a building in repairs to machinery and in power necessary to operate same will be discussed later.

Mill engineers sometimes are skeptical as to the power of reinforced concrete to resist long continued vibratory stresses. In answer to this the Robert Gair Company building above referred to, has been standing in part, the building was put up in two sections with an interval of two years between, since early in 1905 and the Ketterlinus Building since 1906. Even more absolute a refutation of the suggestion that continued vibration will injure reinforced concrete, is to be found by a study of the work of the engineers of the majority of the great railroad systems of this country.

It is difficult to imagine more severe vibration than that caused by a rapidly moving locomotive and train over a steel bridge. Added to the vibration is a tremendous pounding and shock. Nevertheless there are being built all over the country today, reinforced concrete decks, or road beds, on steel girder bridges. Some of these concrete slab decks have been in continual use since 1904, and their service has been such as to warrant the engineers of other railroads to authorize the construction of similar work on their own lines.

From the very nature of the construction, reinforced concrete buildings should be more resistant to vibration than almost any other type. The floor slabs, or arches, beams, girders, and the columns are all poured or cast together forming a homogeneous and monolithic mass of great density and strength. The reinforcement is so placed as to take up all tensile stresses and at the same time tie the building solidly together. In mills where there are looms or long lines of heavy presses, all operating in the same direction there is bound to be some vibration with any kind of a building. With reinforced concrete construction, the vibration is reduced to a minimum.

The attaching of shafting and piping, and the handling of lighting wires in concrete buildings is frequently questioned by those contemplating erecting new buildings of this material. Piping or transmission lines can be provided for quite simply in a concrete structure. The sockets or holes, as the case may be, are set or left in the forms before the concrete is poured. Cutout boxes, switches, plugs and conduits for electric light wires are provided for in the same manner.

The making of changes in piping or shafting or belt lines has caused many owners without experience in concrete buildings to decide against the material. This difficulty of cutting new holes through concrete floors or walls is not nearly so great as it seems on first thought. That concrete is hard to cut through is admitted, but that this is a serious fault is denied.

Ordinarily where a man puts up a new mill or factory he has his machinery and shafting layout well in mind and generally he knows just where each machine is to be set. If this is so, provision can quite easily be made for any bolts or hangers before the concrete is cast. Then too the modern tendency is toward individual motor drive, which eliminates long lines of shafting. But assuming that changes in machines or shafting or heating-pipes or belts have to be made in a reinforced concrete building, a floor can be cut through, or a beam can be tapped, and an expansion bolt or a hanger inserted. The difficulty of cutting through a four-inch floor slab is very much less than is so widely supposed.

The repairs to machinery, the renewals of bearings, the amount of power required to operate machinery, the maintenance of shafting and all similar charges in a manufacturing building of reinforced concrete are lower than in the mill construction type of factory. Shafting or machines once attached to or set on concrete floors remain in place. There is no tendency to walk and to getting out of line with consequent increased wear on moving parts and bearings together with an increase in amount of power necessary to operate. The superintendents of several of the large companies occupying reinforced concrete buildings about New York City have stated repeatedly that they consider this one property of concrete buildings more valuable than any other. In the Robert Gair Building, previously mentioned, there is a savjng estimated by the owner to be $5,000 a year on this item alone as compared to the mill construction building used by the company under the same conditions.

If concrete floors are objected to as being either hard on the operatives or producing dust which would seriously interfere with the manufacturing process, it is quite possible to install wooden floors on top of the concrete slab. This of course increases the cost, but not seriously so. As a matter of fact the prejudice against concrete floors to work on is largely dying out among employes in the average plant. It is true that for perhaps ten days a mill hand will find that his feet hurt him if he is working on concrete, but after ten days at the outside he gets used to it and learns to wear thicker soled shoes and his complaints are likely to be few, because he realizes that the floors are there to stay, whereas he necessarily is not a permanency. The great advantage of a concrete floor over a wooden one, in that it can be easily washed and is of itself more sanitary, has worked to bring about the use of concrete in nearly all plants.

Concrete walls do not need waterproofing.

Because of the dampness in many concrete block bungalows, the impression is that reinforced concrete buildings having walls of the same material are damp. This is quite the opposite of the facts. The company with which the speaker is connected has erected over 280 reinforced concrete structures, representing over 100 acres of floor space, and in none of these buildings is there any trouble from dampness on the walls. In several of our buildings we put in brick curtain walls on the front and rear and concrete walls on the sides. After heavy storms, the 12-inch brick walls will show moisture, whereas the concrete walls have remained impervious. In this class of construction the concrete is placed quite wet and when set thoroughly the walls are very dense and homogeneous. During the process of drying out, the walls will undoubtedly be damp, but as this rarely if ever, takes over four months, the building is dry by the time the stairs, partitions, heating, lighting, plumbing, elevators and other detail fittings have been installed. At worst a slight dampness for the first few weeks of occupancy is all that can possibly occur. Normally, however, when a concrete building is ready for occupancy it is dry and remains so.

The speaker has letters in his possession from piano manufacturers, stating that they have had no trouble from any dampness in their reinforced concrete factories. In this line of industry the slightest dampness would be fatal, owing to the large stock of specially seasoned wood always carried. Dampness in any form reaching this wood stock would ruin it. It is safe to assume that reinforced concrete buildings are entirely dry. If slight condensation on the walls would be a serious matter in certain processes, it is possible to furr the walls. Condensation is not usually a factor and owing to the very slow conduction of heat in concrete, the temperament of the walls remains constant with consequent decrease in the condensation.

Cost is usually the final determining factor in the choice of structural materials. Reinforced concrete will generally run from 5 to 15 per cent. higher in first cost than first-class mill construction, and will be from 10 to 20 per cent. lower in initial cost than steel construction fireproofed. These percentages are not theoretical; they are based upon facts. For example, a large warehouse in Brooklyn was begun in May, 1908. At that time new construction work was scarce, and all contractors, both in the concrete and steel lines, figured very closely in order to secure the job. The successful reinforced concrete figure on this particular building was $30,000 lower than the best bid received on the same plans executed in fireproofed structural steel. A large factory in Philadelphia was designed in steel and estimates received on the original plans. The architects considered an alternative in reinforced concrete construction and saved the owner $60,000. A large publishing house and loft building was recently completed in Springfield, Mass., of reinforced concrete throughout, thereby saving $40,000 over the probable cost in steel. These three instances represent respectively savings of 12, 25, and 10 per cent. In competition with mill construction the percentage depends almost entirely on the size of the building. For structures costing $40,000 and less, and of a height of four stories or less, the brick and wood construction will run about 15 per cent. less than concrete. On larger size buildings, however, concrete gets closer to the cost of the mill construction. The designers of a very large hardware building in Minneapolis took estimates on both reinforced concrete and mill construction. They were surprised to find that the concrete figures were slightly under those of the mill construction. A similar case occurred in Toledo, Ohio. Both of these propositions, however, exceeded $150,000 in value.

In considering the costs of different types of construction the initial cost should not be the only criterion. There are certain fixed charges which enter into the relative values of buildings. These may be briefly summarized as follows: Insurance, maintenance, depreciation, amount of light available, freedom from vibration, elimination of vermin, and the assurance that a fire cannot destroy the building. It is difficult to put an exact monetary value on these different items. Each plant manager would have his own views on the subject and local conditions would alter materially any assumptions. If, however, due consideration be given to the saving which can be obtained on each of these items by the use of reinforced concrete building, it will generally be found that even though the concrete structure cost complete 10 per cent. more than if mill construction can be used, there will be a saving annually of from 1 1/2 to 2 per cent.

In deciding to adopt reinforced concrete construction for textile mills, an owner or his representatives will not be making an experiment in the fullest sense of the term. Reinforced concrete is an established structural material of recognized merit for industrial buildings of nearly every class. Its development has been rapid, but like that of another great modern art, viz: the electrical industry, it has been from the laboratory and scientist to the practical man, and not haphazard practice first and investigation afterwards. The number of reinforced concrete buildings going up all over this country today preclude any experiment on the part of a man selecting reinforced concrete for his new building, even though it be a textile mill.

The following is a brief list of textile or similar plants which have been built either wholly or in part of reinforced concrete:

Hockanum Company Mills, Rockville, Conn.
Eagle Spinning Mills, Hamilton, Ont.
Northwestern Knitting Co., Minneapolis, Minn.
Wood Worsted Mills, Lawrence, Mass.
Warrenton Woolen Co., Torrington, Conn.
Arlington Mills, Lawrence, Mass.
Alexander Smith Co., Carpet Mills, Yonkers, N. Y.
Bemis Bros. Manufacturing Co., St. Louis, Mo.
Botany Worsted Mills, Passaic, N. J.
Minterburn Mills, Rockville, Conn.
Erwin Cotton Mills, West Durham, N. C.
Arnold Print Works, Adams, Mass.
Merion Worsted Mills, West Conshohocken, Pa.

Crane Bros., Silk Mills, Kingston, Pa.

The insurance rates applying on reinforced concrete buildings are as low as on any type of structure. In fact some of the mutual fire insurance companies offer to write the lowest rates on concrete industrial buildings, lower indeed than any other type of construction.

After considering the merits of reinforced concrete as a structural material, its wide usage for industrial buildings of all kinds, its good record in the textile mills built of it, its fire resistant qualities and its ultimate economy, it is difficult to understand how the textile world can fail to adopt this method of mill construction in place of its present slow-burning type.

Sizing.

J. W. LINDAU, 26 Broadway, New York City.

The principal material used for sizing warps is starch.

The only means of distinguishing one starch from another is a microscopical examination, the difference in appearance and size of the granules affording the distinguishing test.

Starch granules are not dissolved by cold water, alcohol or ether, but when starch is heated with water from 114.6° to 165.2° Fahrenheit the granules swell and split open, forming a thick mass called starch paste or size.

By boiling the paste with a larger quantity of water, the starch particles become so finely divided that they pass through a filter and if boiled for a long time the solution becomes clear and the starch is rendered soluble.

The sizing power of corn starch acts more uniformly on warps than either potato starch, wheat starch or any other starch. The size itself remains constant and dependable. The strength being uniform standing over night or over Sunday in the kettle or size box without altering, whereas, potato starch turns acid, falls down and separates into a gelatinous mass if left in size box or tank over night. A corn starch sizing after standing from Saturday until starting time Monday can be reboiled without affecting the sizing value.

Corn starch makes a size which is uniform in its results, gives body to the warp, penetrates the fiber thoroughly, strengthens and lays the fiber, smooths the yarn, and lets the individual thread separate freely without clinging, in a manner unequaled by size made from any other starch.

TO PREVENT DECAY OF STARCH.

Starch is not fermentable, but like other organic substances is subject to decay, although in a lesser degree than many other organic matters. It becomes musty when stored in damp, poorly ventilated warehouses. It is very hygroscopic and easily and quickly absorbs moisture from the atmosphere. Starch stored in a damp place has been known to absorb 30 per cent. moisture. This mustiness is easily remedied by drying with a gentle heat or allowing dry air access to the starch. In general corn starch withstands this tendency with greater resistance than most other starches or vegetable substances.

All starch decays easily and quickly after being made into a paste or size solution in hot weather, unless some preventive, such as formaldehyde, or benzoate of soda is used.

Size when exposed to the air in consequence of a bacterial action, often sours. The addition of acetic acid, formaldehyde, or any good antiseptic prevents this.

Experience proves that corn starch size remains good and sweet for a longer period than other starch sizes.

APPLICATION OF SIZE TO YARN.

As previously stated, the process of sizing is a very important factor in the preparation of cotton yarns. Cotton fiber in itself has not the closeness or tensile strength necessary to withstand the vibration and pull of the heddle in the weaving process; therefore it requires a strengthening and lubricating material which will so thoroughly penetrate the fibers as to make a strong, compact, smooth thread.

Successful sizing requires not only a thorough penetration and saturation of the yarn, but also thorough and rapid drying without scorching, the proper distribution of the yarn and the making of a hard, uniform, compact beam. The value of the size lies in the strengthening, lubricating and softening of the yarn, so as to render it strong, smooth and pliable.

If the yarn comes from the slasher too stiff or too soft, it is hard to weave well, poor production and a larger proportion of seconds result, and consequently, uniform sizing is absolutely necessary.

All weavers claim that half of the weaving is done in the slashing room, for no skill can produce good results from a poorly sized warp.

Careless work in the slashing causes poor production and poor quality.

Sometimes the water of condensation thins down the size in the size box and soft warps follow.

By the use of corn starch a more uniform size is obtained and better results follow. The importance of sizing cannot be overestimated as it does more to make a cotton mill profitable or unprofitable than any other process or department, hardly excepting the card room.

DEFECTS IN SLASHING.

Among the defects in the process of slashing are the following:

Burning or scorching of the ends.

Imperfect drying by which the ends stick to one another on the beam.

Surface sizing in which the size lies on the surface of the yarn and is likely to be rubbed off in weaving, due entirely to the size being too thick and not sufficiently cooked.

Hard and boardy yarn, undersized yarn, soft beams, irregular or rough beams, beams with bad ends, excessive breakage of the threads too much waste in end pieces, stains upon the yarn and discolored yarns.

The secret of preparing size lies in the boiling. Every granule of the starch must be open or else the full sizing value is not secured. The size

must be cooked so that its full adhesive value is brought out, so as to adhere to the yarn, penetrate it and dry, practically cementing the filaments of the fiber together so well adhering that they withstand the chafing action of the working parts of the loom, with which the warp comes in contact.

A knowledge of the value of each ingredient used in making a size is very necessary to the boss dresser, that is, that antiseptics are used to prevent mildew in warps and fabrics, to preserve the size, that softeners are used to reduce the harsh effect of the starch alone, as well as to lubricate the heddle eye and make the yarn pliable; that starch strengthens the yarn, lays the fiber, smooths it and binds the filaments of the fiber together.

At same time the old fallacy that certain starches must be used should be removed, because the value of the size lies in the starchy contents, and not in the name of the starch. It has been proven that corn starch in proportionate quantities will produce the same effect and will successfully replace any other known starch.

The following formulas are used among the most successful mills in this country:

3s to 26s Light, Medium and Heavy Sley:—38 lbs. corn starch, 1.4 lbs. tallow, 100 gals. cooked size.

Warps 8s to 14s:—50 lbs. corn starch, 10 lbs. softener, 2 lbs. tallow, 100 gals. cooked size.

10s W.:—43 lbs. N. starch, 2 1/2 lbs. tallow, 100 gals. cooked size.

10 1/2s, 11 1/2s, 13 1/2s W. 14s W.:—38 lbs. N. starch, 2 1/2 lbs. soluble oil, 100 gals. cooked size.

20s:—40 lbs. corn starch, 1 lb. tallow, 100 gals. cooked size.

21s:—53 lbs. N. starch, 8 lbs. compound, 100 gals. cooked size.

22s:—50 lbs. corn starch, 2 1/2 lbs. tallow, 100 gals. cooked size.

14s:—38 lbs. corn starch, 1 1/4 lbs. tallow, 100 gals. cooked size.

26s W. 80/92 3196 Ento.:—50 lbs. corn starch, 4 lbs. softener, 100 gals. cooked size.

28s 80/92:—40 lbs. corn starch, 60 lbs. softener, 100 gals. cooked size.

30s:—40 lbs. corn starch, 2 3/4 lbs. tallow or softener, 100 gals. cooked size.

21s to 65s W.:—50 lbs. corn starch, 1 2/3 lbs. compound, 1 1/4 lbs. tallow, 100 gals. cooked size.

19s to 30s Marseilles Quilts:—50 lbs. corn starch, 20 lbs. compound, 100 gals. cooked size.

32s:—44 lbs. corn starch, 3 lbs. tallow, 100 gals. cooked size.

41s W. 80x92, 3,200 Ends:—42 lbs. corn starch, 3 lbs. tallow, 100 gals. cooked size.

42s W. 80 Sley:—48 lbs. corn starch, 6 lbs. compound, 100 gals. cooked size.

43s W. 80x80, 3,200 Ends:—40 lbs. corn starch, 2 lbs. tallow, 100 gals. cooked size.

30s, 60s, 80s, 104 Sley:—50 lbs. corn starch, 4 lbs. tallow, 100 gals. cooked size.

50s W.:—54 lbs. corn starch, 6 lbs. sizing compound, 100 gals. cooked size.

55s, 2,800 Ends, 40 in.:—54 lbs. corn starch, 11 lbs. compound, 100 gals. cooked size.

60s W.:—40 lbs. corn starch, 3 lbs. tallow, 2 lbs. bone grease, 3 lbs. compound, 100 gals. cooked size.

60s, 80s, 100s, 2,900 Ends and Up:—50 lbs. corn starch, 2 1/2 lbs. tallow, 3 lbs. compound, 100 gals. cooked size.

60s, 85s (Draper Loom):—60 lbs. corn starch, 6 lbs. tallow, 100 gals. cooked size.

60s, 65s, 70s, 85s, 2,800 Ends:—40 lbs. C. P., 4 lbs. tallow, 100 gals. cooked size.

The statements made as to the sizing of warps with corn starch from 3s to 100s are based on actual facts and from practical experience. No theory but actual results from the best known and most progressive mills in all the mill centers of this country who are now and who have for some time used corn starch. The results produced proved the increased production better working, decreased breakage, easier separation. Dependable working and constant strength and low sizing cost. Wherever corn starch is used properly it replaces and justly so on merit, all other starches for industrial uses.

I am prepared to prove every statement I have made regarding corn starch by practical demonstration in any plant.

Physical and Mechanical Improvements in Sizing Methods.

LEONARD W. CRONKHITE, 369 Atlantic Ave., Boston.

All cotton manufacturers use slashing machinery and sizing materials intended to make a cotton warp meet the physical requirements put upon it by the loom and the cloth effect desired. In view of recent experiments, as well as in view of the fundamental physical principles of what ought to happen to a well-sized and well-slashed warp, general improvements in the machinery, and to an extent in the materials, appear to be feasible. If they are as practicable as they are needed, these advances are matter of concern to sizing practice in every country.

In America, however, the cotton manufacturer has an additional sizing problem of his own. If he enters the field, the American manufacturer of fine cloths today, and of heavy sized goods tomorrow, in competition with makers of such textiles as come from Lancashire, works under severe climatic handicaps. The lack of natural humidity in this country operates against both the weaving rate of any cloth and the very character itself of finer cloths. The question as to how this climatic disadvantage can be remedied

not only by humidifying systems, which at the most can be expected to do only a part of the work, but through the medium of sizing as well, needs solution and wider application.

Briefly, what physical demands does the loom generally make on the warp? The intensity of any one of the demands, to be sure, depends on a number of factors, on the style of loom as on the style of cloth, and in view of the many factors in textile work any answer must be flexible. But in general, contact with the tension rods, with the drop wires of automatic looms, with the harness, with the shuttle, with the reed, and with other threads, all these factors primarily demand in the sized warp ability to resist chafing. In nine cases out of ten the surface resistance of the warp is the important problem to solve for the purposes of production.

To an extent it is true that the opening of the shed and the general tension in the loom requires pulling strength and "elasticity" in the warp. It has accordingly been asserted that above all other kinds of mixtures penetrative sizing mixtures are useful, primarily because by internally binding the fibers together they strengthen the yarn; yarn tests showing increased tensile strength in sized yarns are cited in proof. Once holding this orthodox view, the writer took issue with a heretical mill agent who believed that all the tensile strength in a yarn that can be of any practical use lies in the quality of cotton and the manner of its spinning, and that, in nearly every case, weaving even of poor yarn depends more on sizing with other purposes in view than with the purpose of increasing tensile power. The writer remembers tests in the leading British textile institute, which showed certain sized yarns as having greater tensile resistance after weaving than before weaving, a result which is a little hard on sizing so far as increase of pulling strength is concerned.

Contrary to frequent assertion, not only is tensile strength scarcely increased by sizing in the majority of cases to any really relevant extent, but also "stretch" or "elasticity," which is quite another thing from tensile strength, is only remotely increased by sizing. The elements that can conttribute to it lie in the length of the staple, the twists per inch, and the moisture both in the sized yarn itself and in the yarn as it weaves in the shed. Ordinary methods of sizing are in the event of only slight variations from schedule, quite as likely to ruin the elasticity of a yarn as to help it, and the impregnation of a yarn with a hardening mixture, such as many starch mixtures are, is likely considerably to decrease elasticity.

All this is not to say that penetrative mixtures, when the weave allows their use, do not perform a useful service; thinner mixtures undoubtedly aid in holding the starch to the yarn during weaving, add a fulness of "feel," partly by filling the yarn, and partly because thinner mixtures leave the fibers more as a nap on the warp and in colored goods least obscure the colors. Contrary to the opinion of some, however, thinner mixtures perform even the service of filling the cloth only when they are thinner not by reason of a greater amount of water in the size mixture, but in the essential viscosity of the starch itself which enables a comparatively large quantity of starch to be carried in a very fluid form. After all is said on the matter, it is to be remembered that neither the breaking strength of a sized yarn, nor its elasticity, by any means is the essential criterion of its weaving powers for a given style of goods, and all the advantage may be lost in inability to resist chafe. While impregnation of the yarn may in some small degree increase its tensile strength and may in the case of certain mixings even slightly add to the degree of elasticity,—both results being weaving factors to be considered,—the primary demand of a sized warp is that it possess surface resistance to chafe.

Surface resistance implies two things, laying the fiber and making the coating on a warp as frictionless as possible. The fiber needs to be laid to stay down through the weaving process, and whatever lays it down needs to be as free as possible from any characteristic or acquired harshness, a virtue which of course, is generally appreciated in the smooth feel of the cloth. A sizing mixture therefore needs, according to the demands of a given weave, (1) to have a heavy enough "body," not by virtue of large quantity of starch in a given amount of water but in the essential viscous nature of the starch, to coat the yarn on the outside, (2) adhesiveness sufficient to hold the fibers and to cling to the yarn, and (3) a softness or lubricating property, not simply by reason of softening agents, but also in the characteristic velvety nature of the starch itself, such as is noticeably greater in potato than in corn starch. Towards the conserving of these results the slashing and sizing machinery of course ought to aid.

What, however, does the present machinery do? The slashing machine dips the yarn in size. It dries the yarn, as is obviously necessary,—although it should be remarked that the way steam is sometimes piped and gauged allows the yarn to be so over-dried as seriously to injure its surface and pliability. By a system of lease rods, the slashing machine pulls apart the dried sheet of yarn; that is where the weakness of the slashing machine lies. One has only to feel how sized yarns, especially coarser yarns sized with the harsher starches like corn starch, "open" at the rods, to suspect that this opening a sheet of yarn tends to undo half the work of sizing. In most cases it pulls up the fiber which at best is only imperfectly laid at the squeeze roll. What appears to be a perfectly sized yarn, granted the possible necessity of brushing the cloth after weaving such yarns in order to get a nappy "feel," is obtained by running a thread through the fingers wet with size; every fiber of the thread is well laid. Attempts, whether systematic or not the writer has been unable to learn, have been made to bring the work of the slashing machine more to this kind of result, by the use of revolving brushes better to lay the fiber in applying the size, and by using small intermediate lease rods to separate the strands during the drying process. Nothing yet in this matter seems to have been pushed beyond the practical difficulties at first evident. It is obvious, of course, that the achievement of slashing a warp thus perfectly would

bring up the question of "cover" on the cloth, since the fibers would be too well laid for many cloth effects. But it seems probable that this obstacle could be overcome by a treatment of the cloth if necessary after weaving,q but in most cases in the weaving itself by tricks of shedding and beating up known to the trade. Save for one or two minor mechanical improvements on the slashing machine, such for example as preventing the crossing of threads on the weavers beam by the use of two combs, one straight toothed, and the other set a little to one side with teeth inclined to lay the threads in a given dent down side by side, slashing improvements have got hardly beyond considerable need and a little suggestion. Important changes in the equipment used to cook size have been tried and are meeting every expectation in point of increasing the efficiency of size mixtures, but the data, unfortunately, is not open for publication.

Improvements in the physical nature of sizing materials themselves relate particularly to the question of pliability, which after surface resistance is the other prime virtue demanded of a sized cotton warp in the weave shed. This other weaving requirement, pliability, affects not only loom production, but also the possibility of getting certain cloth effects. This is a question which the nature of the climate, for one thing, makes of the greatest importance in the United States, especially in sheds of the "saw-tooth" type, where getting sufficient moisture in the yarn is a special problem. We can lay the fiber to an extent by employing the more adhesive starches and "sizes" cooked in the most approved method, we can get lubrication and a certain amount of pliability by employing the proper softeners and the less harsh starches like potato starch; but especially in fine goods and with the best humidifying system obtainable, there remains a degree of pliability in yarns that the American factory has no damp climate to produce for it. The road to the desired result lies by the way of starches, softeners and deliquescents, each chosen according as it least hinders the physical effect of moisture in the yarn.

That starch, according to its characteristics, should have a vital bearing on the question of maximum pliability in dry sheds, does not everywhere seem fully known. Starch is starch, cornstarch or potato starch, and that is likely to be an end of it. As between these two starches, corn and potato, the judgment of the investigator is frequently one of commercial bias needed in the exploitation of one firm's products. Potato starch avers that cornstarch cannot be used in any form on anything but the coarsest work; the facts are that cornstarch has been used with some show of success on medium goods, generally requiring or rather necessitating using less starch, an economy which is open to be lost in other results. Cornstarch rejoins that "potato starch makes a size which is stiff and harsh" and that "from every practical point of view cornstarch is superior to any of the other starches known to the industrial world;" and this in face of the fact that in the experience of most mills no starch hitherto known has more of that characteristic softness foreign to cornstarch than potato starch, and that in England where such matters are put to extreme tests, very few mills elect to size with cornstarch although the British manufacturer can get American cornstarch freight paid at a lower price than can an American manufacturer in the land of its source. Of the two products, potato starch with a constitutional weakness under long boiling or when left standing after boiling, and with its high cost and lack of uniformity because of the position of the potato starch industry in America, and cornstarch with its characteristic harshness and lack of very great adhesive powers, for the purposes of pliability potato starch has less tendency to be harsh and brittle in the absence of maximum moisture.

But starch is not simply potato or corn. A class of starch products suited to the specific needs of sizing, and of sizing in this country, was bound to come as it has come, to the knowledge recent as the advance has been of a growing number of manufacturers. So far as pliability in the weave shed is concerned, such starches mean special ability to keep relatively soft and elastic in the driest conditions likely to be found in any weave shed. The exigencies of the commercial side of the investigation leading to these results have made it less necessary to fit the textile industry to a starch that must be disposed of somehow than to fit the starch to the needs of the textile industry. In other words, starches that were designed to be and are pliable under the least favorable conditions, and that moreover can be fitted each according to special needs are obtainable; potato and cornstarch do not represent the latest step in starch science.

At best, however, no starch alone can wholly solve the question of pliability under all conditions any more than it is likely to meet other demands of sizing without the addition of softeners and "sizes." Softeners with slight changes in their character can greatly help matters so far as moisture in the weaving shed is concerned. The usual softener typified by the old standby, tallow, mixes with the starch in what may be called a purely "mechanical" way, melting under the influence of the boiling heat and cooling as a clot on the yarn. Such softeners are not soluble or very diffusive in water, and on the yarn tend to repel moisture. For this reason the ideal softener is one that to an extent is soluble in water. Practical test shows it to have a more thoroughly softening effect on the starch to begin with, and to have no tendency to repel moisture in the weave shed. Care needs to be taken with regard to the chemical character of ingredients mixed with such softening materials, since some of the cheaper substances likely to be used as "sizes" and as "deliquescents" do not always take kindly to soluble products for softening purposes.

More obviously direct, though not more important in its bearing on our climatic disadvantages than either starch or softener, is the class of deliquescents used in England for heavy sizing, though for one reason and another used very little for light or pure sizing. These hydroscopic

substances added to size mixings, directly attract moisture to the yarn, varying, however in the degree to which they do this, and varying very widely in respect to freedom from impurities and indirectly injurious qualities. It is entirely possible to safeguard against the slightest danger of mildew in their use, either with or without using so-called antiseptics, according to whether the cloth is to be bleached or not. It is equally possible to safeguard against chemical complications in the mixing of deliquescents, soluble softeners, "sizes," and starches. The physical advantages of pliable yarn by any of these means are obvious to the manufacturer. But it is also obvious that with starches of different inherent characteristics, with softeners of all kinds from tallow and its many substitutes to soluble softeners and the inevitable imitations, with "sizes" made from gums, dextrines, malts, diatase, caustics, of various chemical reactions, and with such deliquescents as the chlorides of magnesium and calcium, and others, some of them backed by expert opinion bound hand and foot by commercial ties, the manufacturer needs the aid of expert opinion that can advise impartially.

Housing Mill Employes and the Intensive Use of Land.

GEORGE H. MILLER, 6 Beacon Street, Boston, Mass.

THE SIGN OF THE TIMES.

The housing problem is one of the most fascinating and discouraging problems in which the public, the workman, the architect, the sociologist, the political economist and the employer find interest. This interest and fascination are the outcome of each individual's knowledge, by personal experience or observation, of the power and joy that lie in proper housing; the discouragement in discovering the commercial obstacles that prevent the standards which each may fancy, and the apparent inappreciation of the householders.

Within a generation we have seen the housing problem so elaborated throughout Germany that the standards are practically upheld by law and within the same period we have seen a corresponding commercial and military advancement in that same land that alarms the world, and it is universally agreed that the standards of housing have been the agency most instrumental in bringing about the latter progress. At this period moreover it is significant that England is recognizing the causes and effects of her sister country's consideration of housing, and rapid strides are now being made towards the adaptation of the German methods of regulation and development by law and the employment of new and original ideas.

In the United States the echo has been received and at the present time there is spreading across the continent a great town planning and replanning movement, and attempts are being made at standardization of living conditions by law. As a landscape architect the writer recognizes perforce that the great difficulty to meet here is the democratic system of government forbidding the regulation of conditions for the benefit of the democratic whole. We are primarily a commercial nation and the standardization of housing conditions must be effected on a commercial basis. And to bring about results on an Americanized in contra-distinction to a Christianized basis we must meet an absolute freedom of will and choice on the part of the workman, which abhors paternalism.

COMMERCIALISM IS YET THE AMERICAN LAW.

There are those who have observed that when proper conditions have been provided on a commercial basis, for instance the installation of bathtubs for the lowest type of workmen, a feature of tenements forced by law, these features intended to create higher standards of housing have failed to fulfil their purpose, have been abused, and the tubs have been used for the storage of coal, filled with soil in which to grow vegetables, or in some cases to salt down pork. This is due partly to the fact of the tub not being best suited for its real purpose, but primarily is due to the greater necessity for provision of sufficient room for storage of coal or raising vegetables. But it will often be found that with the proper provision for the storage of coal the space has been used for sleeping or eating because rentals are reduced by this intensive use of space, and we must look to the rentals for a cure. And when we reach rentals we reach the great problems of taxation, supply and demand, and cost of living as influenced by most every phase of economics. Then we resort to the written law. But when the law forbids, the world still progresses by the principle of the survival of the fittest. The dominant desire in man is self preservation and the best teachers are experience and example. Unionism and law are the operative's agencies for securing acceptable wages, hours, and conditions of work, but where does the operative stand on the question of housing, where is his aggression? Does he ever think of the influences of self-development which he should employ, of the wastes that he pays for in piecemeal attempts or in financing of building and maintenance, does he ever realize that it should be up to him to protect his own interests in this intricate problem and that he too often misinterprets and abuses the efforts of others in their undertakings towards his welfare?

The better the man the better provision he makes or demands for himself, corresponding to his stage of progression, and regardless of whether they be of self-origin or advanced by others, from the great example of Germany and its recognition by England and the interest in America, we are led to believe that standards of living environment, whether they be in boarding house, tenement, stable or pen are, high and low, hand in hand with progression and are a great influence on efficiency in the life of mankind. The study of the extent and character of the influence is yet in its infancy.

COMMERCIAL CALCULATION.

If the effects of good housing for workmen have a commercial value to an industry it is very diffi-

cult to measure and prove. It is doubtless an indirect value on which the history of industry offers so few statistics that it is impossible to make estimates for a base of investment or law. Rapid advances are being made in methods of analysis and facts are being accumulated which show to a reasonable extent that the state or community is burdened in general direct amounts by crime, pauperism and disease coming out of improper housing and living environment and, for instance, in five years at Letchworth there has been a cut of 18 per cent. in the death rate, but how far beyond the state or community this burden reaches in its varied and intermediate forms and degrees will probably never be measured with certainty, or exact figures be available to prove conclusively the direct value of application by an operator in the manufacture of his goods. When one considers the percentages of success and failure of investment in the cotton industry, the percentages in dividends paid when there is success, human disposition does not seem to be inviting forever so small a proportion of an investment; but on the other hand when one considers the proportion of an investment which labor has the use of compared to the small proportion which the operator has the use of, does it not seem that any reasonable regulation of the former to the benefit of the latter is worthy of closer scrutiny? But if a proportion of investment or of surplus in dividends were utilized on a progressive basis for this regulation it will be found that there is still essential an intermingling of humanism with the investment if returns are to be expected, and the subject resolves itself down to one of man and man. There have been, there are, and there will be operators able to make a success of such endeavors. The Cadburys and the Krupps seem satisfied with their ventures and it is said that there is actual value in the better character of the workmanship as influenced by the living conditions of the employes, that they have affected the quality and quantity of output and cut down waste. It is a reasonably positive fact that improper living on the part of a number of human beings noticeably affects the general efficiency for work; that normally an individual perfects his mental and physical functions through proper life, and that normally, continued abuse of one's mental and physical functions leads to death. And we all know by individual experience that proper life creates higher mental and physical efficiency in whatsoever may be the pursuit.

If an industrial concern can pay good wages it may get a good man to do its work but it can get better work from a good man when that man is enjoying proper living environment and housing conditions. A work horse parade is an object lesson on the one hand while on the other are the inspirations of art; and as conducive environment is applicable to the work of the artist and scientific conditions to that of the horse, so are the same principles between these extremes also applicable to the industrial operative. And as they are applicable to Germany as a nation so are they applicable to the United States as a nation, or to a section, a group of states or a state as a part of the nation, or to the cotton industry as one of its greatest institutions.

Efficiency is doing well the largest amount of work in the shortest period of time. Important components are disposition, training and health. Disposition is generally developed through unconscious influence and environment, welfare systems often being as valuable as dangerous. Training may be influenced by parentage and family relation, and these, more than unionism, tend toward a system of apprenticeship which in America requires rapid succession. Fruitful disposition and training must be accompanied by mental happiness which is largely determined by the relation of difficulty to hope of individual solution, for while happiness is not necessarily a conscious state, it invariably accompanies progress and hopeful expression of desire. Among the components of health are proper descendency, fresh air, sunshine, diversion in exercise and mental happiness.

If in the matter of properly housing industrial employes there is combined with the opportunity in an employe's work an agency tending to create these conditions, is it not reasonable to assume that the agency will create higher efficiency in the work of the operative and is consequently one of actual commercial value to the operator?—and is it not a matter deserving of more thoughtful attention and investment? If it is, then it must be a step in the commercialization of humanism.

ANTI-PATERNALISM.

With the writing of the Declaration of Independence, the Constitution of the United States, and the Emancipation Proclamation the worker in this great new western land seems to have breathed an air instilled with a natural disdain for paternalism. When a real estate man advertises that he is sacrificing land, that he is giving it away for the benefit of the buyer, he finds his buyer suspicious, so he wisely booms his cleverness in having secured the property in advance at such a price as to be able to make a large profit and still let the buyer in on the small end,—and away goes the property. A mill operator often finds himself under suspicion if he honestly attempts to work it either way. Workmen know no such word as suffer in this country, we have not yet reached the economic base. It approaches with the consumption of natural resources. Many industrial concerns would like to improve the housing conditions and living environment of operatives but after a hasty glance at the results obtained and thanks received in some of the better known American attempts the idea is justly dismissed. A workman knows that once he receives a gift or loan from his employer the latter "has him," he is financially or morally obligated; and if on the other hand the operator loans the workman money the workman "has" the operator. As a rule there can be no financial or moral obligation of a directly personal nature between an operator and an operative without an accompanying danger to one or both. Many concerns have suffered bitterly in such experiments, not only to

the extent of not having accomplished the good toward which their moral or financial effort was directed, but even to the extent of the abuse of the effort, of losing both the employe and the money, and being subject to ridicule. Welfare systems too often hit far of the mark. Once tell a man his head is dirty and it will be washed with reluctance. No matter how clean that head may be in the future you have got it on him, and with his progression he will often seek new fields for employment.

THE PHYSICAL SUGGESTION.

Now and then there are tactful superintendents who with the help of a few picked men can accomplish wonders without injury to the individual spirit, but these results but complement the physical restrictions and suggestions. Some concerns have tenderly developed with most astonishing success a demand for the building of physical features for social usage, but such systems never have and never can best fulfill their purposes in economy and with becoming effort unless there is a well-conceived physical scheme upon which to build. One glance at an exposition of the work of these concerns shows a predominent presence of vegetables, flowers, cottages, libraries, athletics, healthful locations and the like, and moreover every example in America strongly evinces insurmountable handicaps in the lack of a physical plan. Fundamentally the medium of almost every welfare system is in dealing with the ground or something on it. The personal pressure must be removed, the betterment must be self initiated and hence more and more the power of physical suggestion is being recognized as the best medium of accomplishment, in contradistinction to the spoken word. For instance, as a word picture best illustrates an idea, still more readily does a graphic presentation reach the mind, while life in the picture consummates the simplicity of suggestion, and utility the effectiveness of its character. The creation of hygienic and esthetic physical agencies through their natural convenience and absence of deterrents suggest the utility conducive to better life. This simply means that there must be more thought and sympathy with the householder in designing the housing, that there must be provision for light, air, sanitation, convenience, comfort, economy, utility, beauty and recreation with a studious regard for the purpose. It means that there must be communal and non-communal features and that merely a house, whether a cottage or a portion of a tenement, does not make a home; that a house must be designed with the ground, that one house must be designed with relation to the other houses, that one portion of the ground must be designed with the other portions, each lot with adjoining lots, and the block with the neighborhood and the neighborhood with the character and conveniences of the community at large, that each may play its part in offering facilities to occupy whoever may be confined to their suggestion.

TRUTH MEASURED BY EFFECTIVENESS NOT BY APPRECIATION.

While the uniform appreciation by workmen of the esthetic phase in line, form, light, shade, color and texture of flower and plant groups and architectural simplicity may be disputed because there are not common evidences of taste or attractive results in individual attempts by them, nevertheless "commerce can make all it can out of the people, but art gives all it can to them,"—it gives them welcome and rest, and whether directly appreciated or not it gains respect and has its influences. The very presence of the inevitable window display of tin cans and geraniums evinces an inclination which will not be restrained, but it is necessary to produce the essentials of a proper arrangement for the intensive use of all the ground in the general scheme, using the plants as the cheapest of building materials for the outside rooms of the house, woody stock of trees and shrubs with here and there the necessary introduction of perennials, and yet leaving sufficient room for the expression of the individuality and personal desires of the householder in complementing essentials of the street and block schemes. If this form of consideration is of value to the home of a rich man, has it not also an application to the collective homes of workmen?

The materials are humanizing and refining, there can be no evil in a sympathy with growing plant life; bear in mind that most of the foreign labor comes from countries where the rough cultivation of the soil is the leading occupation. Caring for the growth of plants, raising vegetables, planting in attractive rows, weeding, picking off dead leaves, watering, etc., picking berries, grapes, fruit and flowers, cutting grass, pruning shrubs, training vines and planning rotations; these are selfish pleasures which develop thoughtful sympathy, restraint, sobriety, patience and handicraft, and an occasional evening spent in this way often saves more than the value of the material grown. Certainly no workman can avoid these influences. I have seen operatives grow sunflowers for the value of the seed for bird food. This type of recreative homestead teaches workmen to prevent waste.

SCOPE AND METHOD OF PROCEDURE.

I have endeavored to point out that these conditions arranged so as to take up all space as the investment dictates and so developed as to suit no other than their given purposes, through the physical only, create an environment and suggest usage which are conducive to better life and a consequent higher efficiency in work. It must not be overlooked that such conditions also help to attract a better grade of employes to a factory, and according to geographical position they help affect the character of labor supply in a town, a city, a state or a group of states, and will have an influence upon the movement of labor, and more and more upon the location of factories. They tend to create additional values in a moral of permanency, averse to strikes and protective property, and they more or less affect public opinion in a way which will not invite severe legislation. In the anthracite regions huge and expensive

breakers have been fired, and like the Southern cotton mill operators the anthracite operators have been well advertised as employers of child labor. Would not the capital in these centers be less subject to the expense of their worries from time to time if they were best known to the public for the splendid housing of their operatives?

While the physical conditions may help to create this public opinion and moral among workmen, a bargain in tenancy or the ownership of a home is more effective, and whatever the method, conditions must be upheld by restrictions and a certain amount of oversight.

There are several methods by which the better physical conditions may be provided for the operatives without the introduction of paternalism. Perhaps one of the most inviting is by the sale of the planned space to a real estate operator with an agreement whereby he carries out the scheme and enforces the restrictions for the price of the value of the property less the cost of excesses if there be any in working out the scheme.

It is also feasible for the mill owner to take bonds and guarantee returns on the enterprise conducted entirely by the independent real estate man.

In the selection of sites there are too many influences to be considered to speak of here, but attention must be drawn to the fact that in a city like the metropolis it has been proven that the ordinary wage-earner cannot be provided with proper housing and working conditions on a commercial basis, nor can transportation facilities be provided that make it possible to live outside the city and work in the city. Yet we must recognize the natural regard for happiness and inspiration in a certain amount of contact with the stir of the city. Complete isolation from gregarious centers is neither popular nor desirable, and yet the economic evils attached to location in the metropolis are applicable in degrees to locations within the less condensed areas; and while in New York with its rapid changes in valuations the adaptation of types to locations has proven an almost hopeless problem, it is by no means so in cities of lesser size, for there are desirable types which, I confidently feel, may be adopted to the satisfaction of the tenant and the investor.

WHEN TO CONSIDER HOUSING.

Many concerns are now interesting themselves in the improvement of long standing conditions, and gaining analyses of assets to be henceforth protected by policy instead of by accident. Here and there in the South there are new examples of admirable tendencies, and even in some of the more densely populated centers of the North there is an inclination to introduce better close front tenement types with attractive communal arrangements in the open courts, or provision made for facilities without unreasonable time, cost and weariness in transit to outside locations.

The greatest amount of success in proper housing is absolutely dependent upon the wholesale method of proceduree. It should be considered at time of selecting geographic location and detailed site of factory. The housing should be designed at the same time as the factory for one is part of the other and although the housing may have little to do with the making of the factory or its size, yet its approach, its grounds, transportation facilities and exterior appearance and the position it occupies may have a great influence on housing. I must ask here why most factory towns are defaced by the invariable barricade fence when a wired hedge would as well serve for protection and not so interrupt the light, and why should not the bare walls of many factories be covered with soft green vines and the hard corners broken with shrubbery masses? This material is very inexpensive, pleasing in appearance and noise-subduing. The wholesale method of procedure will assure the greatest correlated and intensive use of all the land and must be planned at the inception of the factory design. The initial direct investment may be more in the cost of a comprehensive consideration, but the formulation of a policy and a plan for a progressive system of expansion never fails of repayment, for it follows that everything will be well done and that there will be no undoing. A consideration of the physical possibilities should be accepted as an essential of an undertaking even in the trying periods of its inception because of the little proportion of expense involved in the preparation of tentative plans. These are often valuable in capitalizing the factory project.

Almost daily there are news accounts of additions being made to many factories. Are these additions contributions toward the completion of preconceived schemes in which other parts hold an orderly relation or are they made at extra expense because of the inadaptability of the sites available, or do they require the expense of undoing or rebuilding of features? Possibly they are built at the expense of merely a few beautiful trees which it has taken generations to mature, trees which will interrupt the light to the addition, though their destruction may compel hundreds of employes to suffer the heat of the sun during the time when the rest of shade will revitalize them most; or will the relocation of a road be required to a position which necessitates a wasteful, burdensome grade? Visits by designers, surveys, studies and plans cover broad scopes at more reasonable costs and with more thoroughness when uninterrupted.

WORTH ITS OWN RETURN.

It may often be found possible and desirable to mix the grades of housing and for some concerns not to have the factory village stamp in their housing. There may often be areas suitable for market-gardening which may be worked for the benefit of the operatives or by them in short time periods; a nursery may enable cheap sales of plants and with the growth assure a uniformity of planting in additions to a previously planted scheme. There are matters of roads and extensions and these should all be planned in advance to assure easy grades, best appearance, proper junctions and crossings, elastic subdivisions, little cost in construction and that they may be contributory to larger systems; the maintenance and best provision for approach, circulation and outlet

should be considered a subject now of special import to the South. There are areas of shrub and tree-growth to be preserved for value of beauty and shade and as contributions to water power and reservation systems. The time is approaching when each state will have a system of parks and forest reservations made up of the lesser areas of tree growths which here and there occupy land which is mostly rocky or along steep banks of streams or other water, and these will go a long way toward the determination and improvement of a state road system. There is one mill town which supplies the school and churches and other public buildings with fuel from improvement cuttings which are carrying out a scheme of beautification and forest protection. There are often attractive views which may be taken advantage of or created and there is the soil and stone, gravel, sand, etc., which are not always advantageously used at the first need.

In the rebuilding program of the work of abolishing the slums of Washington it was found that the existing lot and block proportions made the most economic type of building impossible and these should be considered with the cottage designing and placing of building lines. Then there are always the possibilities of direct return in protecting the value of better residential land by forming a desirable transition between it and factory sites, and there is the matter of the beautification and recreative use of necessary artificial water features. There are the orderly arrangement and naturalistic screening of waste and storage yards or other unattractive portions of a factory and its connections; there can be expression in appearance and convenience in relation of the factory and its parts with the other features; there are the social and recreative features, public and semi-public facilities such as schools, club-houses, churches, hospitals and baths, libraries, open spaces and athletic fields, facilities for transit and supply. There are to be considered prevailing winds and smoke, elevation, water, sewers, lighting and maintenance, all of which may fit into a well-organized, preconceived, homogeneous scheme for expansion with the intensive use and livableness of the land.

Increasing the Earning Capacity of a Plant.

BY HENRY D. MARTIN, Clinton, Mass.

The theoretical capacity of any mill can be easily ascertained under almost any circumstances. The actual earning capacity of some, as operated, is most always below par and disappointing. On the other hand many mills reach admirably high records of efficiency. It goes without much advertising to say, that the true virtue of good mill management is to secure the largest per cent. of the possible production under such economical administration as to give the plant the largest margin of profit consistent with a reasonably permanent upkeep of the plant. It is false economy and a false profit that is secured by neglecting the upkeep of the plant. This method of making money with a mill has been well demonstrated during the present generation to be unwise, because it is unfair and a failure. It is like taking part of the principal on deposit to pay the interest due for its loan. If the former generation had not planted any shade trees, we would not have shade trees on our streets. We must plant shade trees too. It is our duty in managing mills to keep them in good running order for the owners and to provide sufficient sinking fund to maintain the reasonable integral value of the plant at all times. Although paying better dividends for a time, the efficiency of a plant is certainly not being increased when lessening its earning capacity by letting the machinery wear out without repairing or replacing same. While this can apparently be kept up for a while it cannot last and it is ultimately suicidal. The wisdom of keeping up values is also apparent in other trades. One of the biggest railroad men in this country was recently quoted as saying that instead of putting all the big profits of his lines during the past year into a fat dividend, he would put part of it back into increasing the efficiency of his lines.

The earning capacity of a plant depends upon several other important and distinct measures analyzed as follows:

1. Convenient location of plant.
2. Proper layout of buildings.
3. Right kind of machinery.
4. Correct arrangement of machinery.
5. Uniform engagement of the processes.
6. Purchase of good raw material at lowest price available.
7. Skilled manufacturing organization.
8. Homogeneous service of the entire force.
9. Maximum production.
10. Minimum account of seconds.
11. Minimum waste account.
12. Lowest degree of wear and tear.
13. Sufficient expenditure to keep machinery in good running order.
14. Lowest cost of production.
15. There must be a good market for the finished product as fair selling prices.

It is possible to have a full production and have some or all of the following things wrong, viz.:

Wear and tear account too high.
Waste account too high.
Seconds account too high.
Cost account too high, etc.

It must be a full production with everyone of these other things right. These conditions must be right, or the management is not getting all that could be earned by the plant.

While all is being done that can be done to raise the efficiency of the help, the efficiency of the machinery must not be neglected. There are many ways in which machinery can be coaxed along to give a higher efficiency. Machines appear and act very human-like at times. A little higher or lower speed may prove beneficial; a little experimenting on one or more machines determines the most economic speed. It is a fact borne out by experience that in many instances reducing the speed of various machines increased the production rather than decreased it. An adjustable speed is another advantage. Run higher or lower speed

according to conditions from day to day or from week to week. It sometimes pays to rearrange the entire equipment of a department so that the light is more evenly and better distributed, or so that the traffic of goods before and after used on the machines is more easily transferred to and from same. The writer has in mind a warp room of about sixty warpers in a white goods mill that were operated for years with the creels toward the light instead of the front of the machine toward the light. It was finally decided to turn them around, and a much higher efficiency was secured from this department than previously. Increasing or diminishing the size of bobbins, spools, chains or beams is a matter which is worth giving careful consideration. In some cases mills have increased the efficiency of a department very much by reducing the size of the spools and vice versa. It is all in the matter of using good judgment in finding exactly the right fit or the exact proportions or relationships that should be established between the help, the machines and the processes. Widening and lengthening some machines has been very successfully done in some cases to increase the output. Giving a hand additional machinery and running it slower, or giving them less machinery and running it faster is another problem to work out.

Lastly the processes need to be expertly arranged. So closely related are the machines, their operations, and the arrangement of the processes, that one cannot be wrong without injuring the combination. Too much processing is as injurious to a high efficiency as is too little processing. Some goods are made better by going through an extra process, while others are made better by dropping one or more processes. Too much or too little draft at various points retards progress. So, starting with the picker room, as the goods pass through the mill from machine to machine, and process to process, there is a vast chance for a very fine adjustment of the weight of the goods and the draught at each machine: also the matter of regulating the numbers from day to day is a following-up business that must employ the expert's most careful manipulation. Competition is becoming closer all the time, and it must be borne in mind that the efficiency that gives a mill success today may have to be increased to give it success tomorrow. For a simple example it does not follow that although a mill having too much draught on its drawing frames for ten years and notwithstanding this, made money during this period, that it will continue to pay dividends in the future. If this evil had been remedied ten years back, it would certainly have been far better for the mill. The lines are now drawn so closely around the practical manufacturer that, of necessity, he must allow no leaks at any point. The first and last one-half hours of each day; also before and after dinner, are worth as much as any other part of the working time, and yet there are leaks at this time that cut into the profits. Starting and closing operations on time must be the invariable rule. Balancing the mill is a good thing. Often times a few extra machines distributed where needed soon pay for themselves.

Sanitary Considerations in Ventilating and Humidifying Cotton Mills.

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It has been recognized for many years that undue atmospheric dryness hampers working conditions and reduces product. This has led to attention being paid to supplying artificial humidity, that is to say, water as vapor (or in gaseous form) to supplement climatic conditions. Even in comparatively humid England, one-half the mills use some form of artificial humidification.

Curiously enough, humidification has developed in the minds of most mill men, as a purely mechanical proposition, that is to say in its relation to improved fiber conditioning. Adequate humidity has been recognized as increasing output through strengthening the yarn, reducing electrical tension, improving the yarn by causing the fibers to engage together more closely, and by giving greater elasticity at the same time that greater strength is given. This may be called the direct effect of humidification.

Proper attention has not been given by mill men to the indirect effect of humidity which is upon the working capacity of the operative, the business basis of the humanitarian policy of the New England cotton manufacturers, to which attention has been called.

Unbiased British officials and certain American engineers have demonstrated that, considered both immediately and ultimately, the direct or mechanical value of humidity works on parallel lines with the indirect or operative-working-capacity effect, and that the best results in dividends are secured by considering direct and indirect (mechanical and personal) effects together, in other words taking the resultant of the two working factors.

In textile mill practice this means that ventilation and humidification must be considered as one and the same problem. To secure the largest profits on a given investment, it will pay the cotton manufacturer to consider not only the conditioning of the cotton fibers but the health and working capacity of his operatives as part of a common practical problem.

The most important work in this direction has been done by Dr. Louis Bell of Boston, and by S. H. Bunnell and other engineers of the Griscom-Spencer Co. of New York, manufacturers and also proprietors of the Bell system of humidification, designed to give the maximum conditioning of the fiber compatible with the most effective working conditions for mill operatives. While this system has always been scientifically correct, the reason that it has not been more generally appreciated has been due to two causes: mechanical or practical difficulties, now fully remedied, and a failure on the part of mill men to understand the real factors in the humidification problem.

How wide the range of study required for a proper understanding of the humidification-ventilation problem is indicated when it is realized that it involves as factors:—legal; physiological; bacteriological; practical; engineering (including mechanical, ventilating and heating); and economic

considerations; the last directly involving the financial requirement which has warranted cotton manufacturers in being pioneers in their humanitarian work,—does it pay?

This is an appalling list, and some of the factors of consideration seem at first to be outside the scope of a purely practical paper and more suitable for presentation at a meeting of a highly technical or scientific body. But the substance is simple and practical despite the formidable character of the enumeration. All the factors are sanitary-fiancial at the root.

To take up the factors in order:

LEGAL FACTORS.

In Chapter 104 (Labor Laws) of the Revised Statutes of the Commonwealth of Massachusetts, Sections 51 and 52, read as follows:

"Section 51. A factory in which five or more persons, and a workshop in which five or more women or young persons are employed shall, while work is carried on therein, be so ventilated that the air shall not become so impaired as to be injurious to the health of the persons employed therein, and so that all gases, vapors, disease or other impurities injurious to health, which are generated in the course of the manufacturing process, or handicraft carried on therein, shall, so far as practicable, be rendered harmless.

"Sec. 52. If, in a workshop or factory which is in the provisions of the preceding section, any process is carried on by which dust is caused which may be inhaled to an injurious extent by the persons employed therein, and it appears to an inspector of factories and public buildings that such inhalation would be substantially diminished without unreasonable expense by the use of a fan or by other mechanical means, such fan or other mechanical means, if he so directs, shall be provided, maintained and used."

Attention is desired to the mandate as to ventilation in Section 51 and to the direction that "disease or other impurities injurious to health . . . shall, so far as practicable, be rendered harmless." Also to the emphasis placed on the inhalation of dust in Section 52, and the power therein given the inspector to insist on "the use of a fan or other mechanical means" so that "such inhalation would be substantially diminished without unreasonable expense."

How completely the legal requirements have been met in the Bell system of humidification is interesting to engineer and manufacturer alike, especially when one realizes that it is entirely possible under the Massachusetts Laws for the factory department to order out of the cotton mills in that state all spray or partial spray humidifiers, inasmuch as they fail to meet the health requirements, so to speak, of Sections 51 and 52, to which attention was called. Their spray introduces germ-bearing water into the atmosphere and does not take any impurities out of the air. That this is not mere assertion or unfair criticism, will be shown to your complete satisfaction by citations from unprejudiced authorities.

PHYSIOLOGICAL FACTORS.

To the ordinary mind, "sanitary" suggests plumbing, but in manufacturing, as the law too recognizes, it includes other matters. Of these, ventilation is the most important. This is said advisedly, for today science recognizes that foul air and dust are greater menaces than bad plumbing. With enough fresh air, free from dust, there would be no menace at all in bad plumbing. Ventilation that gives pure air and removes dust and disease will solve the sanitary problem, but in manufacturing, the absolute ideal is not obtainable, as the Massachusetts law recognizes when it says "without unreasonable expense. Dr. Bell and those who have developed his system have sought in their work to approximate the ideal while appreciating the necessary practical limitations.

The Bell system is primarily a scientific endeavor to meet the mechanical requirements for humidity on sanitary lines. As practically worked out, both its mechanical and sanitary effects rest on a ventilating factor,—that is to say, upon adequate circulation of the air in a mill room. By means of an unusually powerful fan, the air in a given space is exhausted into the Bell head. Drafts, tending to the injury of the operatives, and the creation of dust, are avoided by a four-sided distribution from the head through a greatly enlarged opening, so that the velocity of the air current is materially reduced, although remaining adequate to secure a general gyratory circulation in the mill room. Theoretically, a single head of sufficient size could be used to supply an entire room, or even mill, through the use of ducts, but in practice there are many objections to this, for example, the elasticity and compressibility of the air tend to produce an air cushion, or else areas and layers of varying pressure preventing general circulation. This is recognized in the modern tendency to supplement the simple blower, or plenum system of ventilation, with exhaust fans.

In other words, a proper ventilating system requires a means of securing general ventilation throughout a room, "booster" fans, as one might call them. Great Britain has paid more attention to securing official and unbiased opinion on such questions as this than America has. To avoid the emphasis herein placed upon general distribution being disregarded as a matter of prejudice, it is worth quoting the British Departmental Committee on Factory Ventilation, as an acceptable authority. The committee formally reported that:

"In designing any system of fan ventilation, the first points to consider are the quantity of air required and its proper distribution. The quantity depends to a large extent on the distribution; and in many cases a relatively small quantity well distributed is far more effective than a large quantity badly distributed."

The same committee recommends that to avoid an access of carbonic acid gas (the evils of which are so well understood that time need not be taken to explain them) 1,250 cubic feet per person

per hour is required and for practical purposes this should be doubled (2,500 cubic feet as compared with American standard of 3,000 cubic feet) and that 1,500 cubic feet per hour should be added for each gas flame. The committee also states that air with a wet bulb reading of over 70° Fahrenheit is bad, a point to be considered by textile men when artificial humidity is created.

This was not the only impartial commission to study the question. The British have since 1889 limited the relative humidity permitted in cotton mills. They are now going further in this direction. Their method of legislation is in many ways superior to ours, for it parallels the methods of the New England cotton manufacturers as an industry. They begin with impartial official recommendations; allow time for enlightened manufacturers to adopt them; and then pass laws forcing the laggards to move up to the standard. The most recent of many investigations is that by the Departmental Committee on Humidity and Ventilation in Cotton Weaving Sheds, which reported January, 1909.

To those mill men who seek excessive percentages of humidity, the unbiased opinions of this committee and its experts will come as a surprise. To the enlightened men who appreciate that the "conditioning" of operatives is as important as the conditioning of fiber in affecting product, the validity of the conclusions reached will be recognized.

The committee quotes with approval Dr. J. S. Haldane, as showing that with a wet bulb reading above 78° Fahrenheit, "continuous hard work becomes impracticable." Dr. Haldane recommends that an absolute limit by wet bulb only of 75° Fahrenheit in summer and 70° Fahrenheit in winter be fixed where the resultant percentage is equal to or less than the present standard.

How this works out may be shown by the following comparison of percentages of humidity:

Temperature Degrees Dry.	Present Legal Limit Per cent.	Fixed Limit of 75 Degrees Wet Reading Per Cent.	Fixed Limit of 70 Degrees Wet Reading Per Cent.
70	88	—	—
80	77½	—	61
90	69	50	36
100	64	31	21

The committee concluded that the lower limit of 70° Fahrenheit wet bulb reading is the best for both manufacturers and operatives. It quoted approvingly Dr. Leonard Hill, "I should agree with the limit which Dr. Haldane has fixed about 60° to 75°. That exactly agrees also with some determinations of Rubner, who was one of the most eminent authorities in Germany on the subject."

Lest an impression should prevail that this was wholly a medical and academic question, the committee refers approvingly to the testimony of Dr. Pembrey, who conducted experiments on himself, soldiers and medical students and who says that a standard below 70° wet bulb reading, in comparison with even 75°, would be "to the advantage of both employer and employed." Dr. Pembrey explained how by saying that, "At the lower temperature work could be done at a faster rate, more efficiently and with less fatigue, discomfort and injury to health."

The reason the limit should be reduced rests on familiar elementary physiological facts. We are kept from rising bodily temperature or fever by the process of evaporation of the impalpable perspiration. As we work and raise bodily heat this evaporation increases. If the atmospheric relative humidity be high, bodily evaporation is less rapid. The committee's experts found cases where bodily temperatures were raised three degrees by high relative humidity. "Keep your operatives comfortable and they can do more work," is as true in relation to humidity as it is in regard to frozen fingers. This is why the mill man who depends upon steam pots or open steam jets, or who allows fog in his rooms is wasting money. He is lowering the efficiency of his human machinery.

BACTERIOLOGICAL FACTORS.

Bacteriological considerations are of great importance in considering the sanitary-financial aspects of ventilation and artificial humidity, either separately or together. It does not do to dismiss the question of bacteria as "scientific theories," in the light of the extraordinary results, absolute results, incontrovertible as to record, secured by the bacteriologists in combating diphtheria, lock-jaw, cerebro-spinal-meningitis and yellow fever, to take the more familiar illustrations.

First, in fighting any disease, is the upbuilding of individual resistance power. In cotton manufacture, so far as the mill is concerned, this calls for proper working conditions, including pure air and sufficiently low relative humidity.

Second, is the elimination of disease germs or the prevention of their growth and distribution.

Up to the researches of Dr. Bell, American humidifying practice ignored this vital point. Claims have been advanced that a spray "washes the air." What happens is that drops of water carry down the dirt and germs. To become humidity, or vapor or gas, to use interchangeable terms, the water changes its form and by throwing off molecules becomes a gas, leaving behind all other substances including the germs, in other words dries, and the germs and dust, stirred up by feet, or broom or compressed air blast, are blown about the room.

The very smallest germ or bacterium is 64,000,000 times the size of a molecule of water, so the germs cannot ride the molecules any more than the entire population of this country east of the Mississippi could get on the shoulders of a single man. This is why distilled water is safe,—this is why a purely and exclusively evaporative system of artificial humidification gives chemically pure, germ-free humidity, and also explains why Dr. Bell would not use a spray and designed a machine which cannot throw water even in microscopic drops, even when they are far too fine to appear to the microscope. Lord Kelvin's standard of the size of molecules applied to the water molecule

would give a million, million, million molecules in one-twentieth of a cubic inch. If a drop of water were enlarged so as to be as large as this great earth of ours, each molecule would, on the same scale, be enlarged only to a size somewhat smaller than a football and somewhat larger than a baseball, and in comparison the littlest bacterium would be as big as the biggest hotel in the White Mountains.

ENGINEERING FACTORS.

Engineering factors include mechanical, ventilating and heating problems. The latest model Bell humidifier considered in the light of these several factors of the problem is interesting to the practical mill man. In addition to Dr. Bell's close approach to the scientific ideal, Mr. S. H. Bunnell, the chief engineer of the Griscom-Spencer Company, has worked out a mechanically correct machine, as shown in the new model Type G Bell Humidifier.

The Bell humidifier consists of a rectangular copper case containing suitable sheets of moistened cloth. The cloths are seventeen in number, about 20 inches wide by 38 inches long. Each is hemmed at its upper and lower edges, the upper hem being slipped over a slotted brass pipe, and the lower end slipped over a tension rod by which the cloth is stretched in position with sufficient tension to keep its place. The spaces between the sheets are equal, about one inch in width. A fan 18 inches in diameter of the disc type, is secured to one side of the casing at the extreme top. By means of this fan, air from the mill room is drawn into the humidifier casing and forced down between the sheets of cloth, emerging from the bottom of the case where it is deflected evenly on all sides of the machine by a drip pan a short distance below the casing.

Water is supplied to the humidifier by the small manifold pipe by which the seventeen pipes supporting the cloths or mantles are connected. In summer, cool water is used, and the evaporation as well as the contact with the cold sheets, tends to decrease the temperature in the mill room and to promote the comfort of the operatives, often reducing the excessively high temperature of dry climates as much as ten degrees. In winter, the air in the mill room being already excessively dry, the evaporation is increased to such an extent that the cooling effect upon the air becomes too great, the air leaving the case being lowered in humidity considerably as it circulates to warmer parts of the room. This tendency is overcome by heating the water supplied to the humidifier by the introduction of steam into the supply main. In this way evaporation can be facilitated without producing excessive cooling of the air.

Under all conditions the uniform speed of the air through the narrow spaces induces the evaporation of moisture to a maximum which depends only upon the cubic feet of space supplied by each humidifier. It is the tendency of the air current to load itself with water vapor to approximately 70 per cent. when the humidifiers are disposed at about the usual distances. By spacing the humidifiers at a greater distance, the maximum humidity obtainable will be reduced to 65 or 60 per cent.; and by increasing the number of humidifiers in a given room, the humidity may be increased even beyond the figure deemed best by the highest authorities.

The fans of the humidifiers are driven either by independent electric motors of 1/4 h. p. each, or by a light belt from the main mill shafting. The group drive, a feature of modern machine shpos, may be preferred in some circumstances to either of these methods. This system consists of a light shaft operated by a motor of suitable horse power and belted direct to the humidifiers. By operating this motor as desired, the humidifiers may be started or stopped, run during the night or at other times when the mill machinery is idle, or used in advance of the operation of the mill for an hour or two in the morning to drive the humidity to the best working point.

The Bell humidifiers are practically individual units, independent of central station service except to the extent of the water supply, which is taken from city mains or a float tank under low pressure. It is found that about one-half of the water supplied to the machines can be evaporated under favorable circumstances, leaving but a small quantity to be handled by the pump; or the surplus may be run into toilet rooms on lower floors, or otherwise used in the mill service in any convenient way. There are no high pressure pumps, air compressors or special machinery of any kind; and if the humidifiers are supplied by a special pump from any source, a simple connection to the city water main, or to the mill service, will enable the operation of the humidifiers without stopping, in case the humidifier pump is to be overhauled. It is therefore fair to say that the Bell humidifiers form independent units, each operating by itself in such a way that its possible failure would not disturb the operation of the other humidifiers or seriously interfere with the general distribution of air throughout the mill room.

The selection of materials for the casing was made after careful study of the conditions under which the humidifiers are usually operated. The preferred construction is a casing of copper throughout, with piping of brass and all screws and other parts of non-corrosive material, except the motor frame and its bracket, which should necessarily be of magnetic metal; or the pulley bearing when belt drive is used, which is a simple type of ring oiling bearing of cast iron situated outside of the humidifier casing and in no way in contact with the water. Galvanized iron has also been used to advantage, making a somewhat cheaper type of machine, and one likely to have a satisfactory life under the usual circumstances.

The water distribution, as was mentioned, is by slotted pipes delivering water into the hems of the humidifier mantles. As this is the piping surrounded by the hem of the mantle, it is impossible for the water to fall clear of the cloth and in the form of drops to be caught in the air current and flow out of the casing. At the lower edge of the casing there is a gutter formed on the interior walls, by which the drip from the edges of the mantles is caught and conducted out

of the air current so that it may fall quietly into the drain pipe. It is found impossible in practice for water to leave the machine in the air current except in the form of vapor.

In the early Bell humidifiers the casing was made cylindrical, the mantles arranged radially, the fan operating in a horizontal plane and supported on a vertical axis. This type of machine had many objections, the two principal ones being the excessive wear of the fan bearing, and the difficulty of getting at the interior of the machine for cleaning. The rectangular shape was next adopted with many advantages over the cylindrical style. As first made however this casing was insufficiently provided with door openings so that the removal or replacement of the mantles was a rather troublesome job. The practical difficulties were entirely overcome by the simple expedient of making one entire side of the machine into a door, giving access to the whole length of the edges of the mantles opposite the fan. By opening this door access is had to the interior of the case from top to bottom, so that all the mantles can be released at their lower ends, drawn off of the slotted pipes on which they hang and clean mantles replaced within a few minutes. The ends of the supporting pipes are held up against the tension of the wet cloths by a movable rod which is slipped out in a moment when the machine is to be cleaned, and being replaced is held in position by the closing of the door. Spring catches being supplied to keep the doors closed, there are no screws or bolts to be detached in getting at the interior of the machines.

Under the Bell system, therefore, the best results in ventilation and humidity are secured through the principle of perfect distribution. Mill heating by pipes is recommended as giving more uniformity than relying solely upon a hot air blast. Warmed fresh air is forced in by smaller fans than required by a central station system, and exhaust fans are used in combination to assure the disposal of foul air. The air is kept in constant gyrating motion and in general circulation, in this way preserving uniformity and the best conditioning of both operatives and yarn, giving the maximum output for a given number of machines.

ECONOMIC FACTORS.

This leads directly to a consideration whether proper ventilating and humidity pays. Few people realize the cost of sick and physically inefficient operatives in terms of capital and plant, although the reduced output due to reduction of working force has long been appreciated.

Whenever an operative in a cotton mill is absent, it stops a portion of the plant from earning his wages, and also prevents the income for that time on an average investment of $2,000 in mill and machinery, and in many instances a much larger amount. There is no profit in idle machinery, there are no dividends when machinery is working poorly. Apply this to the operatives and the double value of proper ventilation and humidity is apparent. A skilled workman is hard to replace.

When C. M. Shove, treasurer, and Thomas E. McCreery, superintendent of the Granite Mills, Fall River, reported an increase in output of 10 per cent. in a spinning room following the installation of Bell humidifiers, it seemed passing belief, but when the improvement in fiber conditioning and in the air (visibly and microscopically) was noted, it became evident that such results may be expected to follow the proper sort of ventilation and humidity. In the spinning room in question, the foul air is exhausted by a fan through the ceiling in the center of the room. A noticeable reduction in mill room temperature, an important working factor, is reported by Mr. McCreery.

At the Augusta Factory, Georgia, Stuart W. Phinizy, its president, reports similarly improved conditions. In advance of many Southern mill men, Mr. Phinizy advised that on sanitary grounds alone the system has paid. To these three gentlemen belongs the credit for calling the attention of the Griscom-Spencer Company to the sanitary improvement with resultant increased output secured by proper methods of ventilating and humidifying. Messrs. F. H. Silsbee, superintendent, and F. J. Wallace, master mechanic, of the Pacific Mills, Lawrence, raised the question as to the bacteriological conditions before and after humidifying the air, which led to the definite confirmation of the soundness of Dr. Bell's theories and the Griscom-Spencer Company's practical application of them, in actually cleaning and purifying the air, and the impossibility of doing this by a spray or semi-spray system.

To any mill man who will go through the same process of wide investigation, relying upon accepted and unprejudiced experts and authorities, the same conclusions will come: that excessive humidity is unprofitable; that ventilation and humidity must be considered as a common factor in which general distribution and uniformity are the vital points; that it is as important to consider the operative as it is the fiber; and that this requires the elimination of dust and bacteria from the mill room air.

That sanitary considerations are profitable to include in deciding upon lay-out and equipment in ventilating and humidifying cotton mills may best be proved finally by reviewing the history of the New England cotton mill industry. Yankee mill men are hard-headed and kind-hearted, and the record they have made and the dividends that they have earned is proof-positive that there is a dollars-and-cents value in giving operatives proper working conditions, the thesis with which this paper started. As final proof, therefore, is included a review of the sanitary history of the industry in New England. For this review the real credit belongs to C. J. H. Woodbury, of whose untiring research work, copious notes and actual writings, the writer has been permitted to avail himself, and actually has availed himself to an extent that makes him wish Dr. Woodbury would accept the authorship from here to the end of this paper.

A GROUP OF COTTON MANUFACTURERS AND THEIR GUESTS.

THE NEW ENGLAND COTTON MANUFACTURER'S RECORD AS A PRACTICAL HUMANITARIAN AND SANITARY PIONEER.

Lowell was the first American manufacturing city to have a number of cotton mills. Coincidently with their construction boarding houses for the help were erected.

These boarding houses were subject to the most stringent regulations in regard to the food which should be given to the help, such as, that they should not be compelled to eat fresh salmon more than once a week, and that they should have fresh beef at least once a week, which had a meaning which we cannot appreciate in these days of refrigerators.

At that time there were only three hospitals in New England, one at Portland, one in Boston and one in Providence. It was pioneer work, therefore, when the mills required that each tenement house should have one unoccupied room with a bed as a reserve in case of illness, and that on the occurrence of any sickness the agent must be notified at once in order to provide suitable medical attendance.

Before there was a brick sidewalk elsewhere in Lowell there were brick sidewalks in front of the boarding houses to the mills, and across the mill yards in order that the operatives might avoid wetting their feet. Running water was furnished throughout the mills and in the factory tenements in advance of any water works in New England.

The first use of steam heat was in the cotton mills. Overhead cast iron pipe was used. When wrought iron pipe was made the pipes were placed down near the floor, and further improvements have now placed the wrought iron pipes overhead in their former position.

The large amount of waste water from bleacheries and dye houses connected with the Lowell mills naturally led the mill men simultaneously to provide for sewers for house and sanitary purposes. This was years in advance of any other sewerage system in New England.

Dr. Woodbury has said: "Those in charge of the New England cotton mills have been, with rare exceptions, men who have worked in nearly or quite every department, reaching their positions of authority by promotions based upon merit, and these men do not forget early conditions, and have from that day to this applied various means for the betterment of the help as they have been developed. The vigorous condition of men in such positions, notwithstanding their mature years, belonging to this Association, show that the occupation has been a healthful one."

In the matter of heating, the mills have been ventilated by forced circulation of warmed air dating from the application many years ago of a blower by the late William F. Durfee, consulting engineer, at the Wheeler & Wilson Sewing Machine Works at Bridgeport, taking the heat from the upper part of the boiler room and distributing it through the rooms. Later the late B. F. Sturtevant of Boston invented special arrangements of heating coils to warm the air taken from flues reaching above the building and furnishing suitably warmed fresh air to the operatives.

The Legal Relation Existing Between Mill and Selling Agent.

BY WALTER S. NEWHOUSE, 35 Nassau St., New York.

The same principles which governed the relation between the manufacturer and the selling agent in those days now regulate the business transactions between mill and commission house or other selling agency, modified only to meet the more modern methods of doing business.

The various kinds of agents may be classified as follows:

1. The selling agent who sells his principal's goods on a strictly commission basis and who has no responsibility in regard to the payment of the purchase price.

2. The factor who makes advances to the manufacturer up to a certain percentage of the value of the goods and who receives a commission for effecting their sale.

3. The "del credere" agent who may or may not make advances upon goods and who guarantees the payment of the price at which the goods are sold in consideration of an extra commission in addition to his compensation for selling.

The rules governing the relations of the mill with the various class of agencies above named are well established and defined in law, yet the writer in the course of his practice has found that there is much confusion existing among merchants as to the relation and various rights of the parties, and this has led to the belief that a brief statement of the salient principles underlying the relation of mill and selling agency will be of interest and, it is hoped, of use.

The field is a very broad one and it must be understood that owing to the limitation of space, it is necessary to deal with the subject in a most general way. For the purpose of convenience, the term "principal" will be used to designate the mill, and the term "agent" to designate the selling agent, whether the latter is merely a sales agent on commission, a factor or a "del credere" agent.

To whatever class the "agent" may belong, his first and main duty and obligation is to obey implicitly the instructions of his "principal." If he departs from such instructions, he is responsible to the "principal" for any loss that may accrue thereby.

The usages of trade, however, determine in a large measure what the powers of the agent are in the absence of specific instructions to the contrary, and the "agent" is protected if he sells in accordance therewith even if the "principal" is ignorant of the usage, provided the same is general and uniformly acquiesced in by the merchants of the particular locality where the goods are sold. For instance, in the absence of instructions, the "agent" may sell upon reasonable terms of credit and where goods are so sold, the "agent" has implied authority to receive payment therefor and if he make reasonable inquiry as to the financial standing of the purchaser, he is not responsible to his "principal" for any loss which may accrue to the latter on account of the insolvency of the purchaser.

Where a sale of goods has once been effected by the "agent," it is not within his power to consent to a cancellation of the order, his authority being limited to selling the goods of his "principal." This is the case no matter to which of the three classes of selling agencies named the agent belongs. It is believed, however, that this rule is more honored in the breach than in the observance, and it is apparently a matter of daily practice for commission houses to consent to a cancellation of an order without even consulting with their "principal" mill; if this practice were not so universal, there would in all probability be less canceling of orders; presumably the authority or right of the commission house so to do has not been questioned and that this is the reason for the practice; but if the commission house when requested to consent to a cancellation of the order by the purchaser would reply that it is not within its power so to do, it would, it is believed, be often relieved from what might be an embarassing position.

If the mill warrants the quality of the goods to the "agent," the latter is justified in selling them with such a warranty and if the goods are not as warranted and a claim is made against him by the purchaser, the "agent," if he is compelled to compensate the purchaser, may recover from his "principal" the sum so paid; where, however, the "principal" merely consigns the goods to the agent without any representation as to quality and the "agent" in selling them warrants the goods, he cannot when called to account by the purchaser on his warranty escape liability on the ground that he was merely a selling agent and that the purchaser was aware of this fact; the representation will be considered his and not that of his "principal," the mill.

One of the chief duties of the "agent" is to keep his "principal" fully advised as to all facts relating to the consignment which may be of use or benefie to his "principal" or which would enable the "principal" to take prompt measures to protect his interests.

For instance, it is the duty of the "agent" to give the name of the purchaser of the goods to the "principal;" to notify him of any information which may come to him in regard to the financial condition of the purchaser, and to keep him generally posted as to the condition of the market, and for failure so to do the agent may be held responsible.

This duty of the agent to advise the principal as to the name of the purchaser is well exemplified in a case recently brought to the attention of the writer where the "del credere" agent (who guaranteed payment on the part of the purchaser) notified a cotton mill in the South that it had taken an order from a customer for a large quantity of cotton goods. Upon receipt of the order the mill purchased cotton to fill the same and at once began the manufacture of the goods and had about half of them made up when it received advices from the agent that the purchaser declined to receive any of the goods. The mill then demanded from the agent the name of the purchaser which information the agent declined to give.

The mere fact that the purchaser may or may not have ever known the name of the mill manufacturing the goods is immaterial. The mill as undisclosed principal may bring the action, as the title of the goods remains in it subject only to the lien of the factor.

In the case of "del credere" agency the mill at the expiration of the term of credit at which the goods were sold may at its option sue either the "del credere" agent or the ultimate purchaser for the purchase price, and this right is inherent in the mill at all stages of the transaction before it has received pay for the goods either from the purchaser or from the "del credere" agent, and the mere fact that the goods have been charged up by the mill to the commission house does not of itself take away from the mill the right to sue the ultimate purchaser in its own name. By so doing, however, the mill releases the factor from his guarantee if he be a "del credere" agent, for it takes away from the latter the right which he has to sue the purchaser for the purchase price. As soon as the mill becomes known as principal the right of the factor to receive payment for the goods ceases, and the purchaser who after such knowledge chooses to deal with the factor does so at his own risk.

Although as has been seen, the mill has the right to sue the ultimate purchaser for the price of the goods, the factor who has made advances and the "del credere" agent who has guaranteed sales have an equal right so to do, and it is well established that such an action can be brought by the factor in his own name.

On the other hand, the purchaser, in case the goods were not in accordance with contract or in case of failure to deliver within the period contracted for, has the undoubted right to sue the factor in whose name the goods have been sold, or he may at his option sue the mill, the undisclosed "principal" in the transaction, for damages sustained on account of the failure to deliver.

Where goods have been sold in the name of the factor and suit thereon has been brought by the mill against the purchaser, the latter may offset in such a suit any claim which he has against the factor, and if suit is brought in the name of the factor, the purchaser may offset therein any claim which he has against the mill, the undisclosed "principal."

As long as the factor is the only person known to the purchaser the latter may look to him as his "principal," but as soon as the factor notifies the purchaser of the name of the mill, the undisclosed "principal," at that moment his liability as "principal" for future transactions ceases, and the purchaser will be deemed to be dealing with the mill direct.

If the factor therefore desires to protect himself in his dealings with the purchaser, he must in each instance before the sale is made, make known the name of his "principal." So in cases where the mill cannot make deliveries, the factor will be personally held responsible to the purchaser for such failure unless he has made known the name of the mill manufacturing the goods.

It seems to be the belief among commission merchants that if they describe themselves on their circulars and billheads as such, or as "selling agents" that by so doing they are relieved from responsibility to the purchaser—such is not the case—they are still liable to the ultimate purchaser as "principals" unless they fully disclose in each instance the name of the manufacturing mill; they cannot have the advantage of acting as principal in a transaction without the corresponding liability.

(Continued on page 198)

MEMBERS AND GUESTS PRESENT.

Connecticut:
Mrs. Joseph Merriam & Miss Alice Merriam, Middletown.
Mrs. J. R. Montgomery, Windsor Locks.
Adelbert R. Young, Jewett City.
Joseph Merriam, Middletown.
Charles W. Perkins, Versailles.
J. R. Montgomery, Windsor Locks.
Mrs. M. S. Cornell, Jr., Middletown.
William Dee, Bridgeport.
Mrs. Chas. W. Perkins, Versailles.

Georgia:
M. F. Foster, Augusta.

Maine:
Mr. & Mrs. Lyman M. Cousens, Portland.
Mr. & Mrs. E. E. Blake, Biddeford.
Mr. & Mrs. H. P. Garland, Saco.
Clement A. Wakefield, Biddeford.
Harry D. Lord, Biddeford.
Mr. & Mrs. Woodbury K. Dana, Westbrook.
Russell W. Eaton, Brunswick.
Clement A. Wakefield, Biddeford.

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Mr. & Mrs. Wm. Firth, Boston.
Miss Pauline Firth, Boston.
Chas. I. Campbell, Boston.
Mr. & Mrs. W. S. Williams, North Adams.
Mr. & Mrs. Edward J. Feeley, Boston.
E. L. Merrow, Fall River.
Augustus B. Marble, Boston.
S. St. J. Morgan, Boston.
Mr. & Mrs. G. F. Steele, Boston.
Lawrence Whitcomb, Boston.
George A. Ayer, Easthampton.
C. A. Anderson, Boston.
Mr. & Mrs. Chas. J. O'Malley, Boston.
Mrs. V. P. Ring, Boston.
Albert F. Bemis, Boston.
Chas. W. Dennett, Holyoke.
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Herbert A. Walmsley, New Bedford.
Miss Marguerite Walmsley, New Bedford.
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A. P. Massey, Boston.
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Charles T. Plunkett, Jr., Adams.
Theodore R. Plunkett, Adams.
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Mrs. Edgar F. Hathaway, Boston.
Mrs. Wm. C. Hawes, New Bedford.
Mrs. Frank B. Kenney, Lowell.
Frank L. & Mrs. Nagle, Boston.
W. C. Nazro, Lawrence.
Mrs. John H. Nelson & Mrs. Esther G. Nelson, Lynn.
John H. Nelson, Lynn.
Frederic W. Parks, Fitchburg.
Luther G. Goodrich, Boston.
Alfred H. Hartley, Fall River.
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William C. Hawes, New Bedford.
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S. Harold Greene, Boston.
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Mrs. Harry M. Smith, Providence.
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Melvin H. Coffin, Whitinsville.
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G. B. Emmons, Lawrence.
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Daniel J. Danker, Boston.
John P. Marston, Boston.
C. J. H. Woodbury, Lynn.
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Mrs. W. H. Smith, Pawtucket.
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R. M. Mackay, Readville.
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Wallace I. Stimpson, Milford.
James Strang, Indian Orchard.
Gay D. Thayer, Worcester.
Lewis T. Shurtleff, New Bedford.
Abbott P. Smith, New Bedford.
C. H. Clark, Boston.
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E. D. Hague, Boston.
F. Nathaniel Perkins, Boston.
Mrs. Earl S. Jenckes, Milford.
Mitchell Johnson, Lawrence.
Wm. E. Kern, New Bedford.
Frank V. O'Hara, Worcester.
E. E. Palmer, Boston.
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Wm. F. S. Smith, Boston.
Franklin W. Hobbs, Boston.
W. G. Ahern, Boston.
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Gov. Henry B. Quimby, Laconia.
Ronert William Boys, Newmarket.
Philip W. Ayres, Franconia.
Hon. Henry B. Quimby, Laconia.
Walter S. Lawson & Mrs. W. S. Lawson, Somersworth.
John Leiper, Salmon Falls.
Albert W. Thompson, Manchester.
James E. Coburn, Manchester.
Mrs. James E. Coburn, Manchester.

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Herbert Logan Patteson, Ampere.

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V. E. Carroll, New York.
Hugh De Haven, Brooklyn.
Mr. & Mrs. F. A. Adams, New York.
Mr. & Mrs. Chas. Hayes, Jr., Utica.
Henry T. Mansfield, Utica.
Mrs. Chas. C. Ogden, Buffalo.
Mr. & Mrs. Pardon B. Sanford, New York Mills.
W. F. Killip, New York.
James G. Merriam, Oswego.
Stanley R. Latshaw, New York.
J. Irving Lyle, New York.
John B. Wild, Utica.
George V. S. Michaelis, New York.
Rufus A. Soule, Jr., New York.
Fred C. Freund, New York.
J. H. P. Perry, New York.
Theodore H. Price, New York.

North Carolina:
Stuart W. Cramer, Charlotte.

Pennsylvania:
Roland Gerry, Pittsburg.
Chas. Robbins, Pittsburg.
S. H. Steele, Philadelphia.
Wm. T. Westerman, Philadelphia.
Roland Gerry, Pittsburg.
S. St. J. Morgan & Charles Robbins, Pittsburg.
Harry W. Butterworth, Philadelphia.

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Harry M. Smith, Providence.
Mrs. Albert H. Goff, Pawtucket.
E. A. Rusden, Providence.
Mrs. Edward J. McCaughey, Pawtucket.
A. A. Aspinwall, Pawtucket.
Mrs. Wm. Halliwell, Pawtucket.
George C. Hinckley, Valley Falls.
A. O. Buzzell, Woonsocket.
Frederic L. Chase, Providence.
A. L. Willey, Providence.
Edward L. Martin, Pawtucket.
Wm. H. Harriss, Pawtucket.
Mr. & Mrs. A. L. West, Providence.
H. Martin Brown, Providence.
Robert Burgess, Pawtucket.
Frederic W. Howe, Providence.
W. H. Smith, Pawtucket.
Arthur C. Freeman, Providence.
Fred W. Easton, Pawtucket.
Mr. & Mrs. K. J. Merrill, Pawtucket.
Edward J. McCaughey, Pawtucket.
Ezra Dixon, Bristol.
Albert H. Goff, Pawtucket.
William Halliwell, Pawtucket.
A. Tenny White, Manville.
Edwin D. Pingree, Providence.
Frederic A. Chase, Providence.
Edward L. Martin, Pawtucket.
Mr. & Mrs. Alexander S. West, Providence.
John W. Mayor, Providence.

ANOTHER TEXTILE MACHINERY EXHIBITION TO BE HELD IN THE SPRING.

An enthusiastic meeting which attracted much attention was that of the Textile Machinery Exhibitors' Association, which took place at Hotel Mt. Washington, Bretton Woods, during the convention of the National Association of Cotton Manufacturers. The meeting was attended by representative machine builders, with Vice-President Bishop in the chair.

New officers were elected as follows for the ensuing year: President, Frederick H. Bishop of the Universal Winding Co., Boston; vice-president, H. W. Butterworth of H. W. Butterworth & Sons Co., Philadelphia; executive committee, E. P. Hatheway of the American Warp Drawing Machine Co., Boston; M. H. Merrill of the Allis Chalmers Co.; E. A. Rusden of the Textile Finishing Machinery Co., Boston; Mr. Corey of S. F. Bowser & Co., Fort Wayne, Ind.

The position of secretary and treasurer was left open, as that comes within the province of the executive committee, but we take pleasure in predicting the reappointment of Mr. Campbell, to whom a great portion of the credit for the success of the first exhibition is due.

The secretary, Mr. Campbell, made a comprehensive report of the last exhibition, announcing to those present that a 40 per cent. dividend had been declared and paid to the exhibitors and the treasurer showed a substantial balance on hand to begin arrangements for the coming exhibition. A general discussion then took place as to whether or not it was advisable to hold another exhibition next spring, but the unanimous feeling was in favor of it, there being not a single voice in opposition, and it was definitely decided that the executive committee should arrange dates which would agree with the spring meeting of the Association.

It was also decided to make the next exhibition more comprehensive and include in it everything of a textile nature, cotton, woolen, silk and knit goods machinery and supplies, and to send out a general invitation to other textile associations, inviting them to be their guests during the week of the exhibition. A good many names were added to the list of members and a large amount of space for exhibiting purposes has already been booked. The success of the next exhibition is already assured. We advise prospective exhibitors to write to Chester I. Campbell, Park Sq., Boston, Mass., at an early date, engaging choice positions for space.

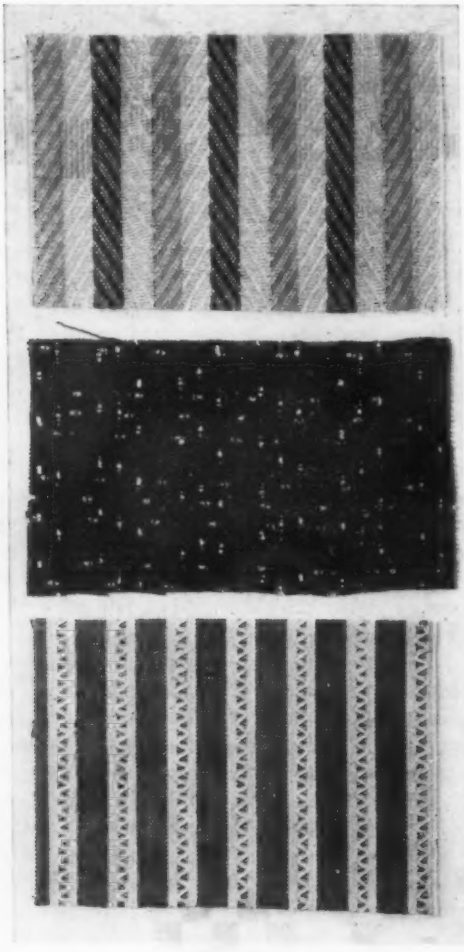
CORRESPONDENCE AND NOTES

Upon Textile Topics At Home and Abroad.

NEW DESIGNS FOR COTTON FABRICS.

BY J. W.

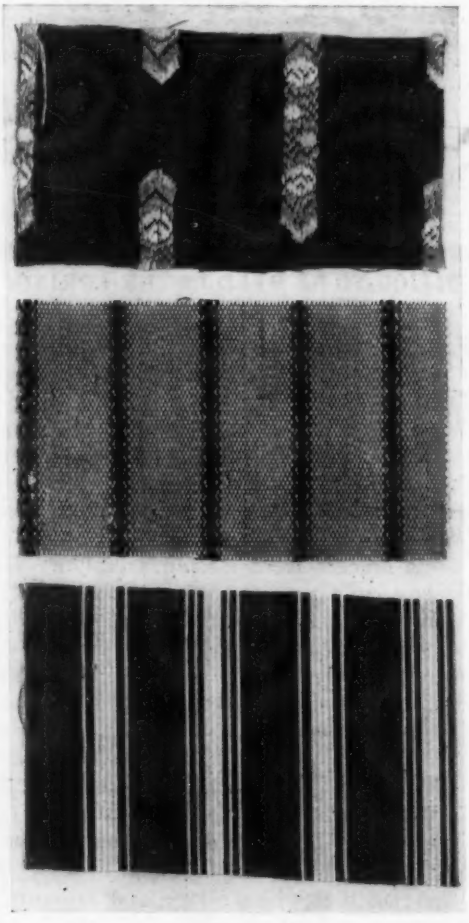
Fig. 1 is a new style much in favor at present, the weave, Fig. 1 A, being given,



FIGS. 1, 2, 3.

and the drawing of the threads turned at regular intervals according to cloth, will be noticed. The stripes are of dark and light from the same colors, and the white ground is mercerized cotton.

Fig. 2 is a material of light texture used



FIGS. 4, 5, 6.

chiefly as a covering over a white or colored dress. It is manufactured in all colors and is very effective and novel in wear. The

spot effect is caused by what is known as knotted yarn, which consists of a fine black

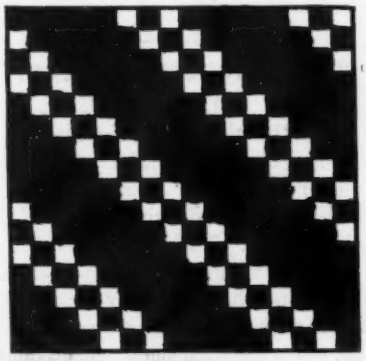


FIG. 1A.

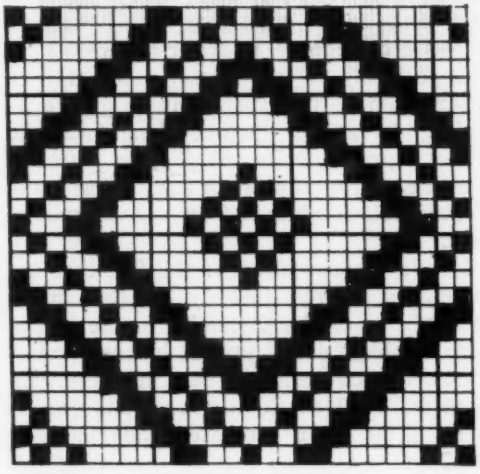


FIG. 7.

thread twisted round a coarse white thread at irregular intervals. This style is becoming general in all countries.

Fig. 3 is a neat, effective cambric style of stripe. A doup or twisted effect is caused by one thick thread crossing six others in the same dent of the reed. All colors of this

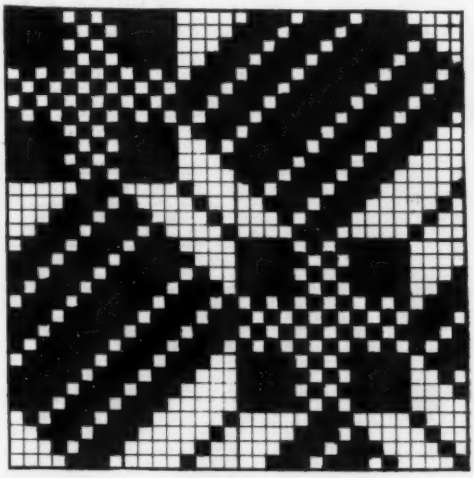


FIG. 8.

style are in favor. Other effects are also very good when three or four of the stripes are arranged in one.

Fig. 4 is a fancy grenadine of light texture, the figure being produced by an extra warp, and where the threads are allowed to float behind, being afterwards cut off. These styles originate in Paris and are chiefly used for covering different colored dresses, and are becoming general in wear during the summer season.

Fig. 5 is another new style in striped poplin which is very fashionable at present. The warp is made from two-fold mercerized yarn, the weft being two-fold black cotton.

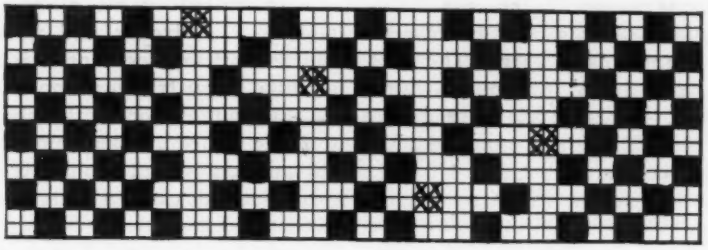


FIG. 9

A fine doup thread working on each side of a narrow black stripe produces the effect.

Fig. 6 is a neat style in silk cambrics and is very effective in the various colors worn at present. A very fine reed is required and a good make would be: 100 threads 2/100s per inch in warp, 100 picks 2/100s spun silk per inch.

Fig. 7 is a diamond weave now being used in woolen fabrics of different colors. Similar designs are also being made in mixtures of cotton warp and wool filling, also cotton warp and silk filling.

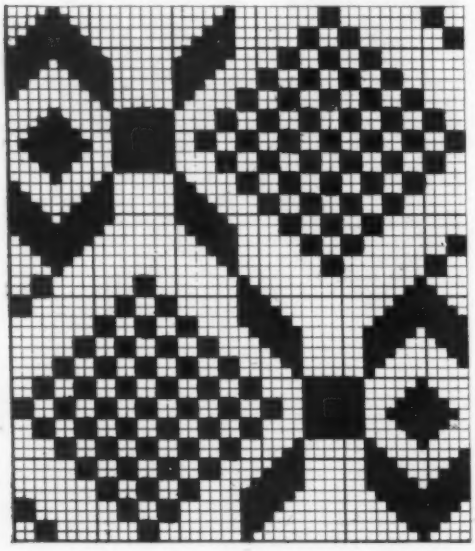


FIG. 10.

Fig. 8 is an effective style for skirting cloths woven with a black mercerized warp, and shot with dark colors of mercerized filling. Different qualities are being made for different weights.

Fig. 9 is a matt weave, the crosses showing where white threads should be placed; solid squares denote black warp. The weft should be two pick black, two pick printed black and white. These styles are being used on the continent for cotton costume cloths in various colors.

Fig. 10 shows a design which should be woven with colored yarn, white warp threads coming between each colored thread. The weave is plain. In some styles a black ground warp is used with the figured style, as given in other colors or white. A pleasing effect is thus obtained.

FINISHING MOHAIR GOODS.

BY WESSEX.

Mohairs, the difficulty of finishing them, and the singular fact that the Continentals seem never to get so good a luster as the Bradfordians, formed the subject of a little chat with a dyer. To believe him, the secret is no secret. What is surprising is not the difference, but the similarity of method, as compared with finishing a worsted serge. For two years his firm tried and made rather a mess of their mohairs. Now their work is reckoned pretty satisfactory and as good as that of the rest. What they have done is to cultivate cleanliness, to scour (at width, not in rope form), to crab, to singe and then to scour again, so that absolutely no grease remains. Grease is the one thing fatal and luster depends on its absence, on sufficient pressing, and on the use of a good quality of mohair well combed and on a good spin of yarn.

I have corroboration of the fact that the finishing is of great severity. In the experience of one of the first mills in the cotton warp mohair dress goods business their goods finished weigh 25 per cent. less than when fresh off the loom with all the oil in them. This is an estimate, made in good faith, which assumes that all the filling calculated to be necessary to a piece has been used and assumes further that both faces of the fabric are singed. If a finisher does not at first succeed, let him make sure that he is not failing by reason of not scouring thoroughly.

A contributory bit of evidence may be added. For dyeing and finishing mohairs the commission dyer's price is about 10 cents a pound. For treating wool lusters which go through almost identically similar treatment the rate is nearer four cents a pound. One explanation is that mohair is a costlier material and can carry a better price. Another is that being costly mohair is the more expensive to damage. A proportion of mo-

hairs are damaged under Bradford treatment, principally by tendering the warp, but they are more profitable to treat at the price than luster linings are.

Among mohairs which sold well last season may be named some with delicately contrasted warp colorings. The cotton warps were striped in apple-green, rose pink and black and similar combinations. The mohair filling was tinted after weaving or dyed to attractive shades of steel. Some popular goods were piece-dyed black in the filling, through which showed blue, green and tan cotton warp effects. A good season in this class of stuff is again expected.

HOW TO SET A DOBBY CYLINDER.

BY GLOUCESTER.

When setting the cylinder on a double lift double index dobby, turn the loom until the bottom knife is about 1/4 inch from the end of the inward stroke. Loosen the set screw on the worm gear and turn the cylinder in

FIG. 1. FIG. 2.

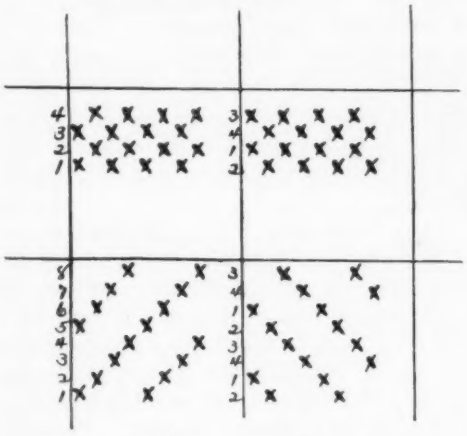


FIG. 3. FIG. 4.

the direction in which it should run until the cylinder comes to a pause, part on the worm gear, and then tighten the set screw on the worm gear. If the cylinder is set in this manner when the loom is running, it will come to a pause about 1/4 of an inch before the inward stroke of the bottom knife. If these instructions are followed the first pick of the pattern will come on the bottom knife and the second pick on the top knife, the third on the bottom and the fourth on the top.

Many fixers who have worked on the double lift dobby that is driven by the

FIG. 5. FIG. 6.

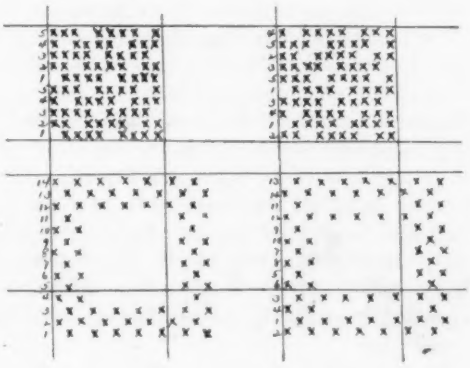


FIG. 7 FIG. 8.

ratchet and pawl, put the pattern chain on the cylinder and do not notice whether the cylinder is coming to a pause when the top knife or bottom knife is in. The result is that several yards of cloth are woven with a misweave before the trouble is discovered. If the weave is plain there will be only 2 picks in the pattern, and it will not matter which pick is woven first if the next pick follows in regular order. If the cylinder is set to come to a pause when the top knife is in, the second pick of the pattern will be woven first and the first pick second, Figs. 1 and 2. If the cylinder is set for a 4-harness twill to the right the weave will be as shown at Fig. 3. If the cylinder is set wrong, the weave will be a twill to the left, Fig. 4. If the cylinder is set right for a 5-leaf satin twill to the right the weave will be shown at Fig. 5. If the cylinder is set wrong the weave will be a steep twill to the left, as shown at Fig. 6. If a spot weave is woven on a plain ground, as shown at Fig. 7, using 14 ends and 14 picks, the weave will be as shown at Fig. 7, if set right. If set on the wrong pick it will be as shown in Fig. 8. Note the skip at commencement and finish of spot. Anyone wishing to experiment might try this on a

number of weaves and see the difference it makes when the cylinder is set on the wrong pick.

ENGLISH NOTES.

By Our Special Correspondent.

In general the wool industries in Great Britain are in a distinctly satisfactory way. The carded woolen branch is fully occupied in Scotland and the low tweed makers in Yorkshire are coming back to full work. Worsted spinners are well booked to the year end and had signally good sales during August, despite holidays. Worsted coating people have all the work they can manage and the dress goods mills, which for months past have got along slowly have received large orders and are in for a busy winter and spring. Business is better than at any time since 1907.

The carpet trade is loud in its complaints, but at Bailiffe Bridge & Sowerly Bridge extensive additions to existing mills are noticed. The cheaper makes are in good enough demand. The cotton trade is still distressed by high prices for raw material and low margins. Improved business does not in all cases imply improved profits. Linen looms in Ireland and the east of Scotland are full of American orders and Irish bleachers of linens have greatly advanced their prices.

* * *

Out of a total of 53 1/2 million spindles in the British cotton industry some 4 1/2 millions are ring spindles spinning American cotton. The branch has not a long history, for there was no ring spinning until 1872, and lately it has been unprofitable. To parties representing one-third of the productive force it has seemed not impossible to organize a price combination. "The Ring Mills Association Limited" is the prospective outcome. Terms of membership are not finally settled, but under the scheme members will contribute $1.25 or so per 1,000 spindles as a subscription and enter into a guarantee for $50 per 1,000 spindles as a bond for observance of the contract not to sell yarn at less than a price to be determined by a scale based on the price of cotton futures.

The proposal is looked on both with disquietude and with disbelief. In English experience these price combinations nearly always fail and their repeated failures very often make the preliminary to amalgamations of capital. A ring spinning trust would not be popular and the average man does not think a trust would be to the ultimate advantage of Lancashire trade. One can point to instances innumerable of the rupture of price agreements in the textile industries; the history of the dyeing trade is one long sequence of the making and breaking of agreements, finally leading up to all-round syndication. In spite of inspections and precautions, subterfuge is rarely very difficult. By invoicing short quantity or making wrong descriptions in books and papers a man may give away advantages almost as easily as by lowering his price. In the history of guaranteed price-combinations there have been times when members have refused to vote penalties on others out of fear of retaliation upon themselves. This is not to say that the ring spinners cannot keep faith, but rather that the sixty and odd of them will have trying temptations. They will have to face bad as well as good times and also face some amount of outside competition.

An unimportant little combination was formed once in the blanket trade. X was its promoter. X and colleagues met at the hotel and agreed on prices. Z lingered a little after the meeting and went to a customer's premises whence X, a little flurried, was coming away. "We're sold," said X, "this chap has given his order. Someone has given us away. He's bowt and at t' owd price." Unchecked by the bad news Z saw this man, had a talk with him and eventually a look at the order-book as proof that X and nobody else was the traitor in the camp. Disillusion does not often come so suddenly.

* * *

It is not as easy in England to raise funds

for a new textile school as for a new chapel, but in the new equipment at Bradford the municipal authorities get some private assistance. A spinner, W. A. Whitehead, puts down a check for $5,000 on condition that the plant includes a set of cone-drawing machinery. A make of card clothing presents all the clothing required. A leading maker of spinning machinery makes a discount of 50 per cent. ($2,500) from his invoice, and engines and dynamos are supplied on exceptionally reduced terms. For some of these effects the college has to thank the Lord Mayor and the president of the Chamber of Commerce for using private influence. The donations are generous, but there can be little enough reason why a municipality like Bradford should not pay full price.

During the summer textile students at Bradford have been taken to near-by sheep farms and have seen different types of sheep in the fields and washing and shearing in operation. Excursions play a pleasant and useful part in their education and parties have been conducted around large machine-building and textile works.

* * *

Bad business in the cotton-spinning line has had its effects on the machinery makers. Howard & Bullough do indeed report that last year was better than any of the previous fourteen, but their fortune was exceptional. Machinists have not all cared to deliver the spindles that have been ordered. In the depressed state of trade promoters of new mills have not been able to raise money and rather than risk inordinate credit some machine builders have preferred to stop production. Brooks & Doxey report severe competition for what business is now being placed, but look forward to better orders in replacement of obsolete plant. Certain it is that the new spindles, put into the new mills during the three boom years, are driving out-of-date plant to the scrapheap. Meantime prices for cotton machinery are lower than for years past.

* * *

No exhaustive particulars are obtainable to show all that the compulsory-working clause of the Patents Act has done for British industry. We cannot say to what increase of employment it has led through the erection of new works, the sale of patents into British hands and revocations throwing manufacture open to anybody. What is fairly clear is that the Act has caused foreign firms to build works assessable at an amount that implies a capital value of about $3,000,000. If this sum is doubled roughly to include plant and equipment some idea is obtained of the effects of the Act in its first year. As a patent needs to be four years old to become eligible for revocation on the ground of non-working, there is room for further results merely from existing patents. The really big gain is of course to come from the patents of the future.

* * *

Some records of what our carded woolen men have said in despondent moments are kept in reports of the (unofficial) Tariff Commission. A Scotch maker of costume tweeds told of a bill for patterns equivalent to 8 cents a yard. The cost may include selling-expenses, with which pattern-cost is usually reckoned. The witness added that less than 4 cents would cover patterns in a better state of trade.

A west of England man deplored standing expenses of 30 cents a yard; the sum comprises wages of foreman, power, rent, rates and taxes. This was his standing cost on a two-thirds production as against 21 1/2 cents in the busiest times.

It was lamented that in so prosperous a city as Leeds, mill property could not be depended on to fetch more than a quarter of its cost. This does not sound like an understatement, but it is a fact that mills realize badly at most sales.

It was a Bradford, and hence a worsted, man who declared in disgust that one year was good and five years were bad in his experience. Yet Bradford manufacturers can show a creditable number of motor cars.

Keighley, one of the out districts of the Bradford market, is reputed to have had 5,-

500 more looms weaving worsted dress goods than it has now. The comparison is with 30 years ago, the present number of looms is roughly 1,500.

* * *

America is not alone in taxing worsted tops or even in taxing them heavily. The Italian duty is 1 1/3 cents a pound, the French 2 1/5 cents, the Russian 10 cents. The duties do not keep Bradford tops out, for Russia will buy 2 1/2 and Italy 5 1/2 million pounds in a year. For tops as well as for crossbred yarns Bradford's great foreign market is Germany. The German tariff on unbleached worsted yarn is the moderate one of 42 to 51 cents per hundredweight and the German market is good for 35,000,000 weight. The French yarn tariff rises from $2.85 to $10 per cwt., and the Russian beginning at $21 ends at $28 per 112 lbs. Large Russian orders have been put down lately and in a regular way Russia is a market for 2 1/2 million weight of chiefly coarse, crossbred yarn.

* * *

In the way of large foreign orders nothing bigger has been seen for a while than that for 1 1/2 million yards of woolen khaki placed with J. Walker & Sons, Mirfield, for the Turkish army. The carded woolen mills besides clothing the British army, navy, police, postmen and so on, are in the way of getting some foreign government orders. Government orders from both Japan and Russia came at the time of their war, but the tendency is for the small states to weave for their own troops.

* * *

A Moscow cotton manufacturer gives an Englishman the whole story of the makings of good trade or bad trade in Russia in a nutshell. "If the peasant," he says, "can afford enough cotton to make two shirts for himself and two dresses for his wife, we have a good year. If he can buy only one garment apiece we have a bad one." The illustration would hold good for all Asia.

Consequent on bad seasons the Russian cultivator has had little money of late and on a three-year average Russian consumption of raw cotton has gone down to 680,000,000 pounds. On an estimate Russia has about 8 million cotton spindles at work.

Another estimate gives Russia now 405,430 flax spindles, 12,380 linen looms and a production of 99,000,000 pounds of tow and linen yarns—about 74 millions being of the former.

Although some progress in the modernization of Russia's tariff is reported the stiff, old rates on textile machinery are not earmarked for change by the advisers.

* * *

Various paragraphs appear concerning balloon fabrics, some of them recommending experiment with spider silk from the African forests or elsewhere. Ramie is suggested by persons who possibly forget that ramie cloth is singularly heavy for its bulk and that the fiber cannot be spun fine. The much more important subject of clothing for aviators is neglected and it is this that must concern manufacturers most. Not all the wearers of motor cloaks, motor veils, etc., are motorists and it is just as sure that all wearers of aviation garb will not be aviators. The conquest of the air will tell on fashions and it may not be much too soon to be getting "Aero" ranges ready for fliers and those who will imitate fliers' dress.

* * *

In the ordinary way the English manufacturer consults an analyst only as he consults his doctor—which is when something mysterious has gone wrong inside. Sometimes he comes along with a rare and wonderful ingredient. For example, a worsted man produced a pattern which by all accounts had been treated with a secret compound which softens the handle and improves the weight by 10 per cent. So secret was the compound that only one chemist hitherto had been able to find out what it was. The pattern was left with many exhortations to the chemist to use care. The result was disappointing for the only foreign matter present was the finisher's familiar friend, zinc chloride, and that not in a proportion of 10 but only of 0.6 per cent.

Mystery surrounded a "finishing oil" until the analyst made a job of it. An entirely false character or preventive of mildew was given the "oil," which actually was a mixture of soft-soap and water with a small quantity of oleic acid added. In some "oils" presented the oleic acid is omitted and either alkalies or pure water take its place. These solutions do not impose on the larger producers, but the small and ignorant ones, for want of consultation with an analyst, pay fancy prices to importers all the years of their life.

THE BRADFORD AND FRENCH SYSTEMS OF WORSTED SPINNING.

BY JOHN BROWN.

(Continued from September.)

The drag in a throstle frame is altered in proportion to the distance between the edge of the cop or eye of the flyer, and the surface of the spool. Thus when paper tubes

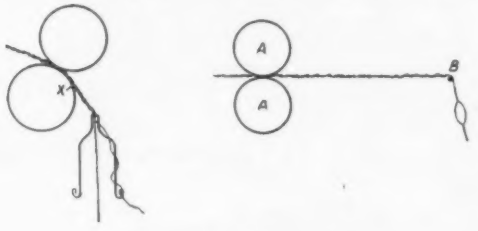


FIG. 6.
A. Front Rollers. B. Spindle.

are used in place of wooden spools, slightly more twist has to be put in to counterbalance the drag. In mule spinning, as there is neither cop, fly, nor ring intervening, and the winding of the thread on the cop is the only process going on, the draft is merely nominal, and, to a certain extent the twist is of secondary importance. In this respect the mule is far ahead of all styles of throstle frames for short wools. Thus it follows that less twist being put into yarn a better filling weft is produced. Owing to the fibers being perfectly separated, by passing through porcupines, there are fewer broken fibers, and consequently more even yarn. Because of the way twist is put in by the mule, there is less waste. For the same reason there is an almost complete absence of fly, such as is caused by the revolution of rings and flyers.

The fuller benefits of this are shown in fabrics in which fine counts are used, as with the same counts mule spun yarns produce a fuller and better looking cloth, because the wool has only gone through one twisting operation.

BRADFORD SYSTEM.

The set of machines about to be described is calculated to turn out about 2,800 pounds of 2 dram roving in a working week of 50 hours. The average yarn count is 60s, spun from fibers from 2 to 6 inches in length, the

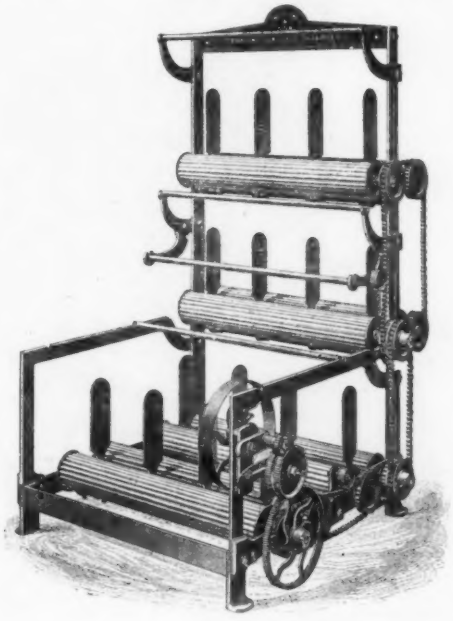


FIG. 7.

top weighing 4 ounces to 10 yards.

The first gill, shown at Fig. 1, has a double feed and 2 deliveries. In this box 6 ends of the tops are put up each side. To prevent double drafting the end must be taken from outside of the top. The tops are now laid in self acting creels, shown at Fig. 7, which are driven from any convenient part of the box. The tops are laid side by side in the creel and are kept separate by the upright steel plates. As the creel revolves it delivers the sliver at the same

speed at which the back roller takes it in. Thus all drag is obviated. The faller pins in this box are set about 20 per inch. With a draft of 5 to 1 the sliver comes off one-fifth heavier than the top sliver, that is, 307 drams to 40 yards.

In the second can gill 5 ends are put upon each side, which with a draft of 5, brings out the sliver at the same weight, that is, 307 drams.

Third process. Double spindle gill, shown at Fig. 2. Two of these boxes are

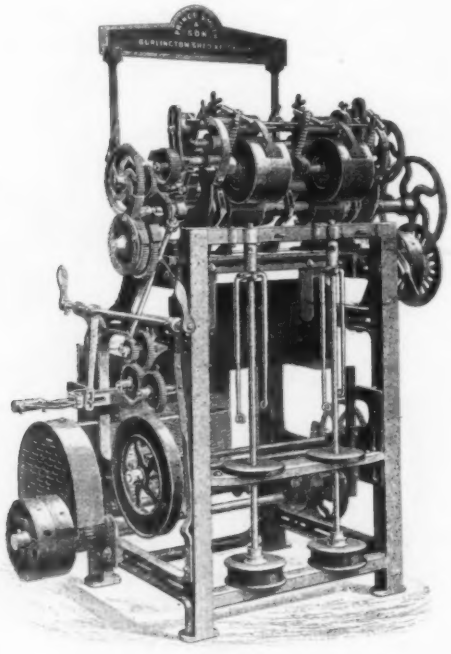


FIG. 8.

required to deal with the output of the previous box. Two cams, each containing 2 ends, or 4 ends in all, are put upon each side of this box, and are doubled into one with a draft of 5. This gives a 245 dram sliver.

The bobbins on which the sliver is wound are heavy and in order to bind the edges of sliver it is guided by a flyer, which puts in a slight twist. The relative speeds of the flyer and the front roller determine the amount of twist put into any given length of sliver. The twist required in this box for 60s is about 1 1/2 turns per foot. In all the subsequent processes in open drawing the amount of twist is increased as the sliver

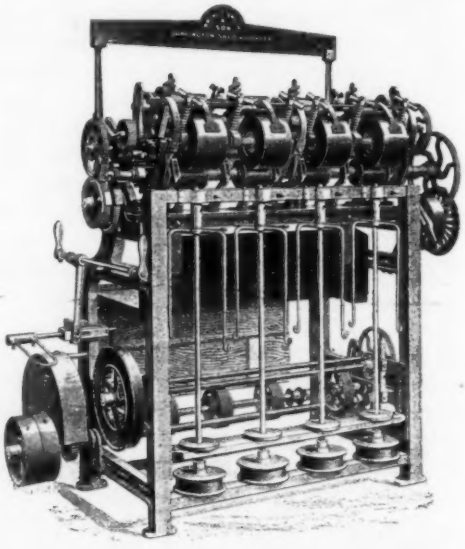
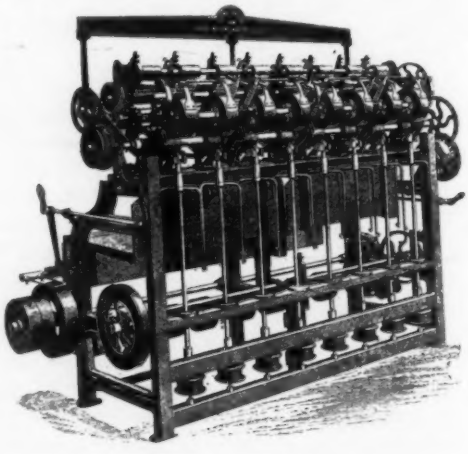


FIG 9.

becomes smaller. This is the last process where gills or fallers are used for steadying the sliver as it is being drawn.



F.G. 10.

In determining what amount of twist to use in any process, great care must be taken not to put in an excess. Enough must be

put in to give strength to unwind the bobbin at the next process, and to leave the sliver so that if it is pulled apart in two by the fingers, none of the fibers will be broken. If the wool is short more twist is required than with sound, long staple stock. With rollers 2 inches in diameter and running 77 revolutions per minute the spindles should run about 58 revolutions per minute to give a knock-off motion. Here the second test is taken to see if the slivers are coming off the right weight. If too heavy the draft is slightly increased, or if too light, decreased. From this box the bobbins are put in sets of 4 to each end in the next process, and should weigh about 40 pounds. If the box has been turning off light weight, say 9 1/2 pounds, the draft is decreased until an equal

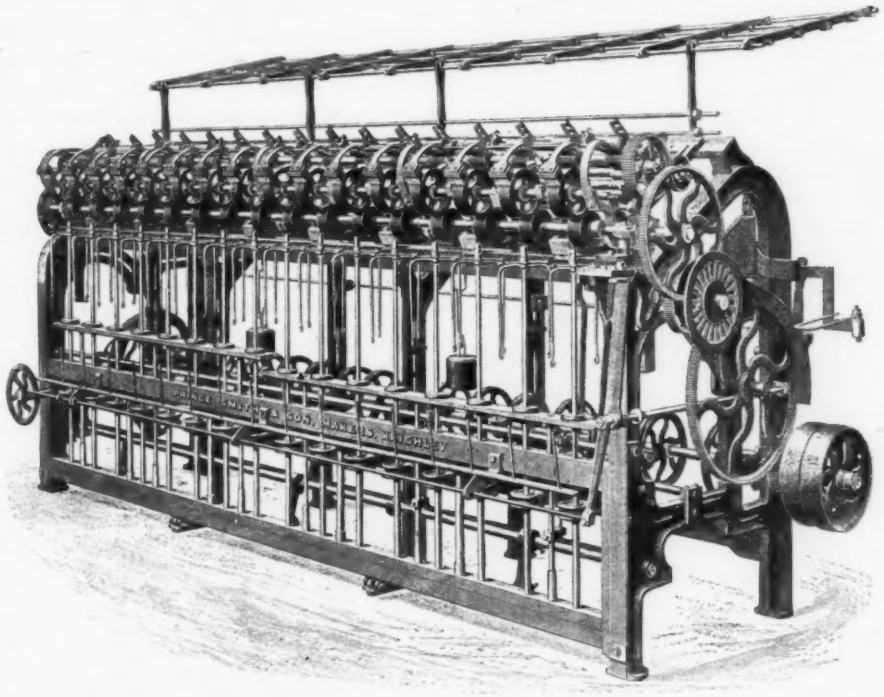


FIG. 11.

the twist required. A 4 spindle drawing box is shown at Fig. 9. One of these is required to follow a 2 spindle box. Carriers are used in place of fallers in this and all subsequent processes, to steady the slivers as they are being reduced in their passage from the back to the front rollers.

As the twist is slight a good draft can be obtained here, say 7 1/2 to 1. Five ends at the back doubled into 1 in front gives a sliver reduced to 161 drams. The bobbins from the 2 spindle gill are put in an overhead creel, as shown in Fig. 12. The sliver is now passed to the 4-spindle weigh box, similar in construction to Fig. 9, but fitted with number of bobbins weighing 10 1/2 pounds each, are made. These are then put in sets of 2 at 9 1/2 pounds and 2 at 10 1/2 pounds each, thus making up the 40 pounds for each 8-spindle box sliver. In the 4-spindle weigh box, 4 ends are doubled into 1, and with a draft of 7 1/2 the sliver weighs 85 drams.

An 8-spindle drawing box is shown at Fig. 10. This box, similar in its parts, but smaller in construction to previous ones, uses bobbins 12 inches long in place of 14 inches, with a draft of 7 1/2, giving a 45 dram sliver and a twist of 4 1/2 turns per foot.

(To be continued.)

Questions and Answers

Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring ,not for publication, but as an evidence of good faith.

For reply to questions that are not of general interest to readers of textile journals, such as those relating to the composition of yarns, analysis of fabrics, etc., we will charge the enquirer with the cost of the investigation.

Carded Woolens and Worsteds.

Editor Textile World Record:

Suppose I am operating a plant of 20 looms on men's wear, woolen and worsteds, and buying my yarn. Does the tariff afford me any more protection when I am making worsted goods than it would if I were to change my plant over to goods made from carded wool yarn? In other words, is the weaver of carded wool goods at the same disadvantage as the carded wool spinners; or to put it in another way, is the weaver of worsted goods who buys his worsted yarn getting the same advantage from the Payne tariff which the worsted spinner is getting?

Maximum (1119).

It is impossible for several reasons to make the comparison desired by "Maximum." First, carded woolen yarn is not sold in such variety that weaving mills can buy yarn for the carded woolen goods demanded by the trade. Carded woolen yarn is sold, but for special purposes, and we do not know of any mill that buys these yarns for its entire production. A carded woolen mill would necessarily have a yarn making equipment.

On the other hand a twenty-loom worsted mill would necessarily buy its yarn, because it would not be economical to manufacture so small a quantity of worsted yarn as that required for twenty looms.

As a result the comparison desired by "Maximum" is between a mill weaving worsteds and one both spinning and weaving carded woolen goods. It is evident that no close comparison as to protective tariff conditions is possible between two such mills. The only profitable method of comparing the tariff on worsted and carded woolen goods is to compare the tariff on the respective raw materials and then on the finished products. It will be found that the ad valorem equivalents of the duties on carded woolen goods are higher than on worsted goods, owing to the lower valuation of carded woolen goods. The burden on the carded woolen industry consists in the prohibitory duties on the wool and wool by-products required for its products; whereas the worsted industry is able to import wool for its products at comparatively moderate duties, and dispose of its by-products under the protection of prohibitory rates. These points have been elaborated in our columns during the past ten months.

Hollow Space in Ply Yarn.

Editor Textile World Record:

Enclosed you will find a sample of threads being held together by adhesion of unvulcanized rubber such as we use in preparing our threads for the construction of various kinds of rubber goods. Each of these threads as per sample, was made of six strands of yarn twisted together. You will note in looking at the end of the threads as twisted by our machine that there is a hollow space in the center of the finished thread, and the peculiar part of it, which we fail to understand, is that in taking four of these threads in twisting them together there is no hollow space in the center of the thread when finished. Five is not so bad, but above that number, six, eight or ten, the hollow space seems to enlarge with the number of threads used in the twist. What I want to know is a scientific explanation of this, whether it is due to our method of twisting, or whether this is the case in all cords or ropes manufactured by being twisted together with a certain number of yarns or threads? Tubular (1114).

The tubular effect or "core" which is formed when six or more folded threads are cabled together to form one thread is quite usual if all the six threads are maintained at exactly the same tension during cabling and it would be interesting to know if all the six threads have been run together on one bobbin prior to cabling or whether they have been on separate bobbins. Apparently the former has been the case, since on untwisting the yarn all six threads are found to take up the same amount. Naturally if an even tension is maintained each thread must

take up a position side by side with its neighbor. Consequently when twisted the effect is somewhat like that of a twisted flat band or whose width is equal to that of the

FIG. 1.

combined diameters of the number of strands cabled together and the course of the threads is shown at Fig. 1. A section of

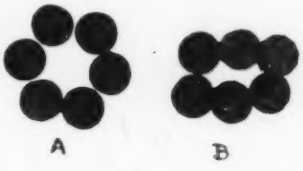


FIG. 2.

FIG. 3.

FIG. 4.

Fig. 1 will show the threads, as in Fig. 2 A or Fig. 2 B, if the cabled thread is afterwards flattened, which is the case in the sample submitted. It will be evident that the threads must of necessity take up such a position, since each thread at the same tension takes up the same amount during twisting and is twisted round a common axis. Each thread rests as it were on the preceding one, as will be seen by Fig. 1. Therefore the section must reveal a hollow core. This core is present even when three or four threads only are cabled, but of course it is insignificant, as will be seen from the sections at Fig. 3, A and B. Naturally the more threads are twisted the greater becomes the core.

Evidently what "Tubular" requires is a cabled yarn with a solid core, that is, a yarn which would give a section like Fig. 4. Clearly, then, this thread which forms the core must remain straight throughout the length of the cabled thread and of course will take up practically nothing during twisting, while the remaining five threads being twisted round it take up a certain percentage according to the number of turns per inch and thickness of yarns. It must be evident, therefore, that to obtain this result the thread or threads (if more than one is required to form the core) must not be at the same tension as the others. They must be held tighter than the rest. Usually when cabling from separate bobbins this naturally takes place, as the pressure of the outer threads tends to force one or more to the center and of course this thread then does not come off the bobbin at the same rate as the others and remains practically straight. If, however, the threads in the sample sent are being doubled in this fashion provision must be made for holding one or more bobbins tighter than the others. This will form a solid core which is evidently what is required.

Roper.

I have examined the samples with the more interest because I have never before noticed a hollow space in the center of ply yarn, but will give my idea of the cause and the spinner of these yarns can easily put the opinion to the test. The threads show distinctly the hollow center mentioned and it must be due, in part at least, to the fact that they are loosely twisted, as an increase in the amount of twist entirely obviates the central space.

In twisting ply yarns together to form a thread of the nature of the sample, there is always a tendency for the ply yarns to lie edge to edge in the twisted thread, and un-

less they are twisted together very tight, the chances for forming the mentioned hollow centre are increased. This will not show up in using a small number of ply yarns for the reason that the diameter of the twisted thread is not larger than twice the diameter of the ply yarns composing it, thus allowing the ply yarns to touch in the center. In confirmation of the above opinion, anything over a three-ply rope will carry a central core around which the outer strands are twisted and against which their inner surface rests. In some cases this central core is composed of several strands.

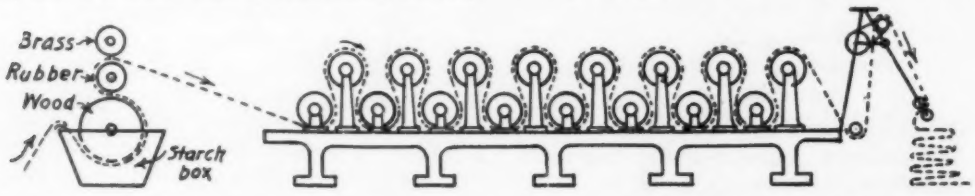
Steuben.

Weighting Bed Spreads.

Editor Textile World Record:

Is there a way to weight up bed spreads, and if so, how is it done? Also to what extent can they be weighted? Our starch mangles and drying cans are arranged as shown in accompanying illustration. Do we require a different apparatus?

Samosett (1100).



I regret that I cannot give you information in regard to the amount of filling to use in weighting bed spreads. The goods will be harsh to the touch if too much clay filling is used. Nothing gives the weight so well as more picks of filling and better yarn.

Crawford.

Price for Knitting Hosiery.

Editor Textile World Record:

Please give us the prices paid for knitting half hose on a 3 3/4 machine with 176 needles? Also the price paid for looping and boarding.

Hooper (1116).

The prices paid for this grade of work are as follows:

	Per doz. prs.
Knitting ribbed top	½ cent.
Picking on or topping	6 cents.
Transferring or knitting foot	4 cents.
Looping	4 cents.
Boarding	2½ cents.
Pressing	1 cent.

Merrill.

Prices of Worsted Yarn.

Editor Textile World Record:

We have recently started to manufacture worsted knit goods, principally sweaters, and would like to have some information regarding the comparative prices of worsted yarn in this country and in England. I am sending you under separate cover four samples of worsted yarn on which I have recently received quotations as follows:

No. 7—2/26s—97 1/2 cents in August.
No. 8—2/22s—95 cents in August.
No. 9—2/16s—97 1/2 cents in July.
No. 10—Oxford—$1.05 1/2 in July.

All these yarns are in the oil. Colors cost 5 cents more than white and Oxfords 8 cents more than white.

Dunster (1117).

We forwarded the four samples to our Bradford representative with a request that he obtain quotations on them in the Bradford market and his reply is as follows:

Regarding your four samples of worsted yarn. I have placed these before different experts and their valuations agree very closely. I give you the opinion of the man who went most into the matter:

No. 7, 2/26s	1s 10½d
No. 8, 2/22s	1s 10 d
No. 9, 2/16s	1s 10 d
No. 10, Oxford	2s 1 d

Yarns of similar quantity advanced about 2 cents during August, in which month considerable sales were made. A spinner of a quality similar to No. 8 thought 44 cents a top price. He thought a man would do well to realize so much. You should have seen the stare these people gave me when I showed that in America such yarns are bringing around 4s (96 cents) a pound. Indeed I had to bring corroborative evidence to convince them.

The Bradford and American prices for these yarns are as follows:

	Bradford price.	American price.
No. 7, 2/26s	45 cents	97½ cents
No. 8, 2/22s	44 cents	95 cents

No. 9, 2/16s ..44 cents 97½ cents
No. 10, Oxford, 50 cents 1.05½ cents
Wessex.

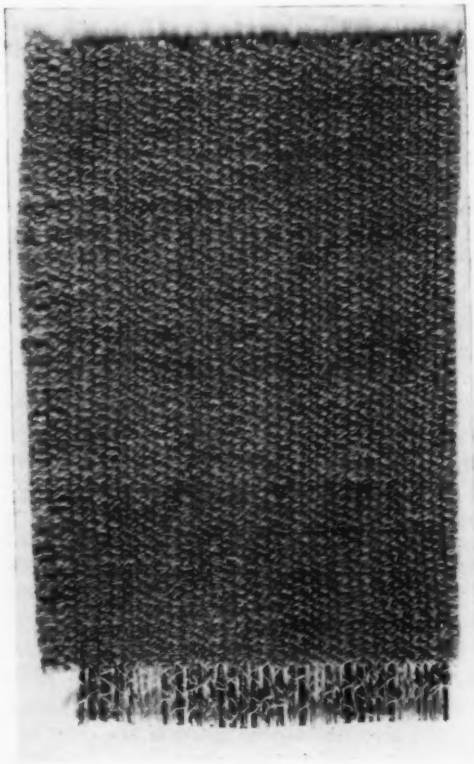
Splicing Horsehair.

Editor Textile World Record:

I notice in the February issue an article describing the process of splicing horsehair so as to make a continuous filament. Can you inform me where this process is employed and give me any further information in regard to it?

Narragansett (1098).

The process described in our February issue was of English origin and accordingly we referred "Narragansett's" inquiry to our



English correspondent, who replies as follows: The manufacture of horsehair cloth and the splicing of the yarn is confined to a district in the southwest of England. I enclose a sample of cloth, shown at Fig. 1, in which the filling is horsehair spliced by the process described in the February issue. This style of interlining has driven the old class of goods out of the market, or at least out of the best tailor shops. You will notice that 4 threads of 7 ply horsehair alternate with 2 threads of 2 ply, all being bound by fine cotton binder threads. The advantage of this fabric is that the hair does not work loose and protrude from the garment as is the case with the unbound hair filling.

Wessex.

Waste on Ribbed Hosiery.

Editor Textile World Record:

Please let me know what amount of waste is figured per dozen of fine gauge ribbed hosiery, made of 18s carded peeler yarn? The ribbers are running without stop motions. Also how many needles are generally used per day on the same stockings. Orleans (1112).

The amount of waste on rib frames using 18s carded peeler yarn will vary considerably where stop motions are not used. In some cases the waste will average as high as 5 per cent. and as low as 2 per cent., but this is mostly the fault of the yarn. We are running our ribbers with stop motions, one boy running 20 machines, and the waste for the last six months averaged 10 ounces per 100 dozen. We use 16s carded yarn. The number of needles used on the same machines should not be more than three for each machine. If the machines are kept oiled and clean three needles will be sufficient. Oiling and cleaning have a great deal to do with broken needles. The ribbers should be cleaned every two weeks. By cleaning I mean the cam cylinder and needle slots. It would be economy in the end if "Orleans" put stop motions on his ribbers, if he has ten or more, as they will pay for themselves in less than a year. Ravenswood.

For the last twenty years (comparing the average of the years 1886-1890 with the figures for 1906) the consumption of cotton in Italy increased from 145,011,298 to 384,410,660 pounds; the imports of cotton yarn have declined from 9,274,212 to 1,821,724 pounds, the exports of yarn have increased from 682,358 to 22,877,300 pounds; the imports of cotton goods have declined from 22,736,684 to 8,038,208 pounds; while the exports of cotton goods have increased from 1,429,514 to 61,744,840 pounds.

KNITTING DEPARTMENT.

For Knitting Mill Machinery, Equipment and Supplies, see pages 236 to 253. Also Buyers' Index.

THE KNIT GOODS SITUATION.

A good business has been done by the jobbers on heavy weight underwear during the past month, a great many retail buyers having apparently awakened to the fact that fall is upon us and that their trade will want some heavy goods. In almost every instance, these retailers now want immediate delivery and the jobber, of course, is endeavoring to please the late comer and at the same time is trying to get out the orders taken during the early part of the year for September delivery. As a consequence order and billing clerks are working overtime in the more important jobbing centers. As is usually the case in the face of an advancing market, manufacturers are slow in making deliveries and we learn that jobbers are complaining bitterly just at present, claiming it is almost impossible to get delivery of ladies' seven-pound ribbed goods that they bought in January at $1.90, and men's twelve-pound ribbed shirts and drawers sold at $3.37 1/2.

We learn that duplicate orders are being placed at advance prices and deliveries are being promised early in October. Ladies' six-pound ribbed goods that were sold early at $1.75, have been advanced to $1.95, and the seven-pound goods that sold early at $1.90, are now held at $2.10. Buyers are asked $2.15 for extra sizes weighing seven pounds. On the better grades of ladies' ribbed goods, the advance is less; 7 1/2-pound combed goods that sold early at $3.37 1/2 have been advanced only to $3.50; $3.50 numbers to $3.62 1/2.

The Avalon Knitwear Company have issued a circular letter changing their prices on bleached and peeler vests and pants to $3.62 1/2; extra sizes to $3.87 1/2; union suits to $7.00 and extra sizes to $7.50; and state they cannot promise shipment of any of their line before November first.

So far, the advances asked on wool and worsted goods have been small, ranging only from 25 to 37 1/2 cents on goods from $6.75 to $7.25. This, of course, does not represent the advance on raw materials alone, but indicates that manufacturers of this class of goods have not been oversold on their production to any extent and are willing to average their yarn costs and to divide with the buyer so long as any materials at old costs remain on hand.

Men's fleeced goods have not yet been advanced in price to any extent. This is probably due to the fact that manufacturers of this class of merchandise have not had as much business this season as formerly. The Groat Knitting Company are offering through their new representative, The Knit Goods Agency, their line of fleeced goods at $3.05 cash, and promise quick delivery.

A fairly good business is being booked for immediate, as well as for early spring trade on men's medium weight flat merino shirts and drawers. Of these there are some lines shown at $3.50, but the more popular lines are those at $3.65 and $3.75. It is claimed for these that there is a goodly proportion of wool stock. It is said by some retailers that this branch of the underwear business is growing very rapidly and that customers who heretofore have bought 50-cent fleeces, are now either buying heavy weight ribbed shirts or a light weight merino in its place.

The number of advertised lines of knit underwear continues to increase. The Oneita Knitting Mills have recently added their "Velvetrib" to the list and are circularizing the country with literature extolling its merits. This is the fabric made on the Interlock machine recently put on the market by Scott & Williams.

Spring lines are without exception in a well sold up condition and some buyers who recently tried to place additional orders with manufacturers have found some substantial advances in prices facing them. Salesmen

for the jobbing houses have been out during the month of September and from all the reports that we get, retailers are placing their orders very freely."

Men's balbriggans for 1910 have sold very well, notwithstanding the great call for porous and nainsook underwear. The Ford Mfg. Co. have repeated last season's performance by selling their five-pound combed Egyptian line at $3.25 with hem tail, and $3.50 with looped rib tail. The Lebanon Mills have sold to A. S. Haight & Co. their five and one-half-pound combed Egyptian at $3.50. The Gilbert Knitting Co. opened the season with two lines of balbriggans, a four-pound garment at $1.75 and a five-pound garment at $1.90, with a line of fancy stripes, plain blues, oxford and gun metal at $1.85. We understand that these have since been advanced five and ten cents per dozen.

A new line of mesh combination suits has been put out by the Capron Knitting Co. The fabric is similar in appearance to the Porosknit and is called the "Hol-E-Knit," made in boys' sizes at $1.90 and in men's sizes at $3.50. It is stated that buyers have bought these goods very liberally. This same concern is also showing a line of men's mercerized ribbed shirts and drawers at $3.62 1/2; combination suits at $7.00.

HOSIERY.

The advance in cotton yarns has compelled many manufacturers to advance their prices and it is only a question of time when most of the others will be obliged to follow suit. An advance of 5 per cent. on low priced seamless goods is common, and in some instances the advance is still greater. This condition has caused activity on the part of buyers in placing duplicate orders and manufacturers in general are reported to be well pleased with the amount of this business received.

It is a notable fact that prices of full fashioned hosiery have not yet been advanced, but many styles that were offered for sale early in the season are not to be had now at any price. The manufacturers after selling a certain quantity, possibly up to the limit of their yarn contracts, preferring to withdraw such numbers entirely from sale, to paying and asking an advance, which is just what they would have to do in order to continue the numbers in their line. As an instance, full fashioned lisle hose that were procurable early in the season at about $1.82 1/2 are not to be had now, and it will probably be a long time before they are again offered.

The silk hosiery industry is especially active and the supply does not begin to be big enough to meet the demand. Anyone making a silk hose of standard quality at about $8.00 per dozen can sell as many as he can make. One manufacturer who recently started to make such a hose is sold up against a big production four or five months into 1910.

The demand for silk hose seems to resemble that of long silk gloves not very long ago and in some channels it is thought that, if manufacturers were in a position to supply the trade with all that they wanted, there would be another repetition of the costly experience of many jobbers with long silk gloves. There is no danger of this occurring at present, however, as the legitimate demand is much greater than the supply. This is a field that would employ many more manufacturers than there are in it now.

The prices in the Chemnitz market have not tumbled as it was thought they must and would after the passage of the Payne bill. On the contrary, recent advices inform us that if anything, prices have advanced again on account of the advancing costs of maco yarns. German manufacturers who were almost panicky immediately before and after the passage of the act advancing hosiery tariff rates, have regained their equilibrium and do not seem at all scared about the future of their hosiery business with the United States. While it is true that the business done heretofore on goods costing up to M4/40 has been practically ended, it is stated that some importers are buying this class of goods and paying up to M4/10 for the same. For the second limit they are paying up to M6/20 and often the full limit on the

M8/80 grade. Good sized orders have already been placed on these two last named limits, enough to keep the manufacturers busy and more orders are being received by every mail.

New samples are now being made by manufacturers at prices that will equal what have heretofore been considered the popular landing prices, but it is stated that qualities will be so inferior as to make them undesirable, and besides that, it will be weeks more before they are completed.

It is the popular opinion in Chemnitz that there are no large quantities of foreign goods in this country, and this opinion is based upon the fact that they are receiving cables to ship all goods at once,—even those originally ordered for December delivery.

There is little doubt but that in a few months or earlier low priced stock lots will be offered in the Chemnitz market, as many makers who have been making low priced goods will be forced to sell at a loss in order to raise money to liquidate accounts.

In conflict with the above mentioned belief as to there being no large stocks of foreign goods in this country, it is known here that some importers have very big stocks on hand of this class of goods, and some of them are offering their trade for 1910 delivery, identical qualities as those of 1909 and at the same prices. It will be generally conceded that in no other way could this be done profitably than by selling against stocks on hand.

Many importers have not as yet commenced to take orders for 1910 delivery, preferring to wait until they know just what they will be obliged to do, and being loath to ask advances until forced to. Those who are soliciting orders are reported to be doing a good business and retailers seem to be generally in much better frame of mind for placing orders than they have been for some time.

In 1905 the manufacture of cotton textiles in the United States gave employment to 315,874 wage-earners, of whom 46.6 per cent. were adult males, 40.6 per cent. women, and 12.8 per cent. children.

FULL FASHIONED KNITTING.

BY PAVONIA.

(Continued from August.)

Fig. 13 shows a shaft and arms with rollers for three cams. This is the lateral motion equipment for the needle-bars. Every arm is secured to the shaft by set screws, while each arm with a roller, which imparts the motion to the entire shaft through contact with the cam, is pinned besides being fastened by set screws.

This shaft works as one piece (the three cams being set to work in unison), and contains no loose parts. The backward and forward swinging motion is varied by the shape

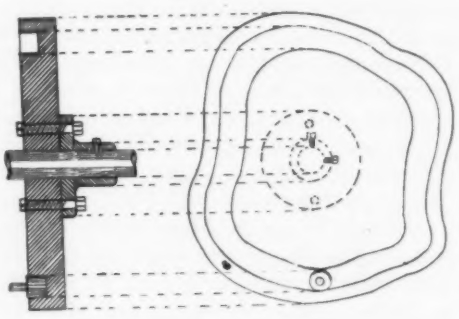


FIGURE 11.

of the cams. The shaft has no side motion, and its circular or swinging movements, when working, does not exceed 20°, as shown in Fig. 13. The accessory parts are shown in Fig. 12. Four cams are used in a number of machines for the needle-bar actions; on some machines five of these same cams are used for the same purpose. Fig. 14 shows a shaft carrying five cam arms. These give motion to the entire shaft, which carries nine double needle-bars, or 18 sections. They have also a swinging movement, with the shaft, p, as the center. The 18 work arms and the five power arms are firmly secured by set screws and pins, making this shaft and its attachments practically a solid body.

It will be seen, therefore, that while a single section would require an entire equipment of working parts, such as cams, levers,

arms and ratchets, the addition of a second section would require only certain parts to be added, some of the other parts requiring lengthening possibly or making a little stronger. By the addition of each succeeding section, at necessary intervals, the cams and parts are duplicated and added in the manner which experience has proven to give the best results on the machine. Some motions require a cam every two sections, and

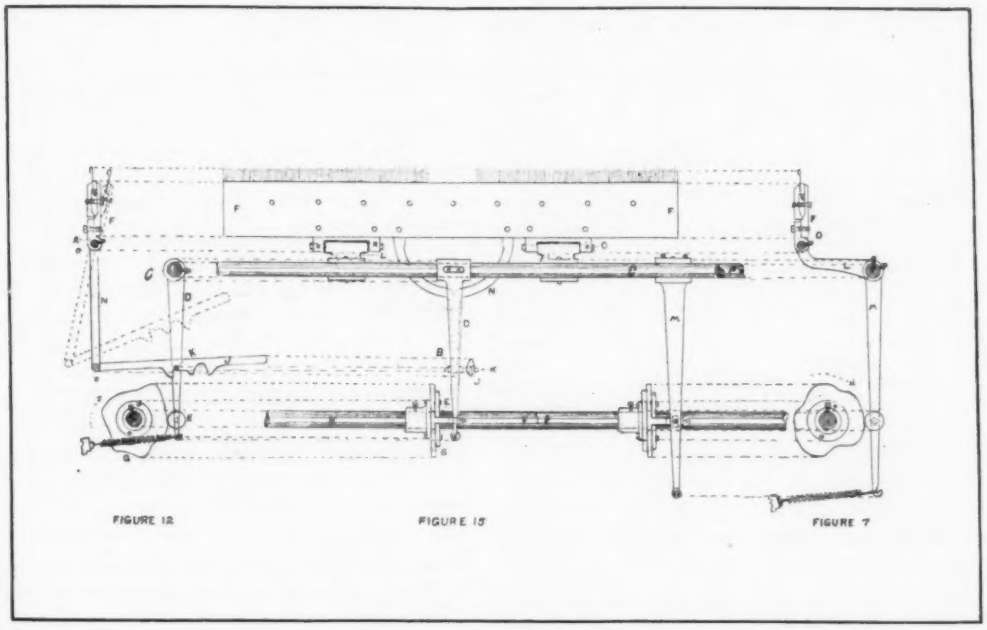
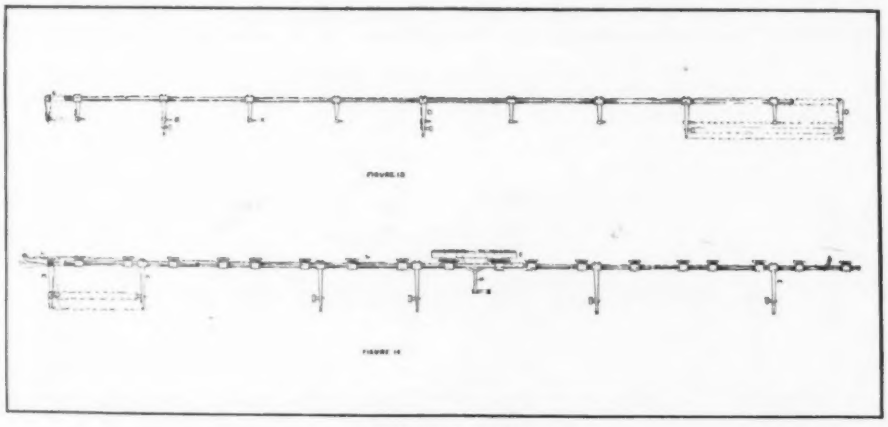


FIGURE 12 FIGURE 15 FIGURE 7

others need one every three sections, while with some there are six sections between adjacent cams, until we find, as before stated, only a single cam actuating the whole of one motion, the same for a large 24 section as for a one section machine. The slow speed of the cam shaft, usually about 50 revolutions per minute, allows cams to be used which have only an outside working surface. There are some machines with two surfaces on the cams, but all the machines in America have the single surface. The rollers which run in the groove on the double cams require no springs because the cams give both in and out motions, but with the wearing of either the cams or rollers strong springs become indispensable. Fig. 11 is an illustration of the double grooved cam which has been generally discarded, it being useless on the slow motion of the modern cotton machine; it would be indispensable on a similar high speed motion.

All the rollers now are made to run on the outside edge of the cams and the reciprocating movements are effected by strong springs. These springs draw the rollers tightly down on the edge of the cams, assuring the engaging of the roller and cam at every point, high or low, as the cams revolve. In order to make the flat needle-bar go through the knitting motion, it requires two different sets of cams, and by them it is possible to make any desired up or down motion and also any backward and forward motion. As all the cams revolve simultaneously, both needle-bar actions are in operation at the same time, enabling any angle or curve whatever to be made with the needles, according to the design of the cams. At one point the needles move straight up-

wards, at another forward, then in a diagonal line, and so on. They form almost a circle in going through a certain portion of the knitting motion. Fig. 12 shows the link arrangement and elevation through which the lateral motion is transmitted from the cam roller to the needle-bar. The dotted lines also show the link disconnected from the cam motion. This disconnection is necessary in the event of a needle having to be replaced and is performed by simply lifting the link as shown in the drawing, after which the needle-bar is free to be moved backward or forward by hand, its only connection being with the loose pins at B.



FIGS. 13 AND 14.

Through shaft C, Figs. 12 and 13, the power is transmitted from the three arms, D, to all the other camless arms. These arms give to the needles their backward and forward motion. It is by the aid of these arms that the needle beards are opened and closed. When all the links are connected up, every needle must work in harmony from one end of the machine to the other; that is, if the three cams are exactly uniform in shape and every adjustment is perfectly made. Fig. 12 shows this backward and forward action. Shaft C, front elevation, Fig. 13, and end elevation, Fig. 12, is a stationary bearing for the arms and cam rollers which it carries, and forms the center of a circle through which arm, D, would swing if free from the cam and tension spring. O is also a stationary bearing in so far as the lateral movements of the needle-bars are concerned, being in reality a fulcrum of the entire bar. This bar, as shown in Figs. 1 and 6, is firmly screwed together, the arm, N, and the bearings, R, both being included in this solid mechanism. The arm, N, is the power arm; F, the work arm for the needles, while the fulcrum is at the loose pin, O. If we trace out the entire motion at Fig. 12, we will find when the cam revolves, which is always in the direction of the arrow, that the roller, E, and arm, D, is forced outward. This causes link, J, to pull the power arm, N, of the needle-bar connected at loose pin B, which, in consequence of the pin fulcrum, O, naturally causes the work arm, F, which carries the needles, to move in the opposite direction. In other words, when the cam exerts an outward thrust, the needles always move inward, or exactly opposite.

In this type of machine, the motions that are imparted through levers are in most instances reduced considerably by making a longer power arm and a shorter work arm. In the motion which we are now considering, the roller will in all probability move the distance of an inch, to gain a quarter inch of movement of the needles. The object of this is obvious to one acquainted with minute and intricate adjustments on almost any machine.

Having now obtained the lateral motion

of the needle bars, we will examine the up and down movements of the needles. Fig. 7 shows the cam and arms which perform this very important function. By studying Fig. 14 in connection with Fig. 7, we may succeed in better understanding the action. Fig. 14 is a longitudinal view of the shaft, P, with its equipment of cam arms and needle-bar arms. The long cam arms, M, if disconnected from the tension spring, I, Fig. 7, would tend to move in a circle with P as the center. As a result shafe P is to the vertical movements what shaft C is to the lateral motion, namely, the stationary fulcrum of power arm, M, and work arm, L. M and L are separate castings, but are both securely pinned and also fastened with set screws to shaft, P. It will be seen that an outward thrust of arm, M, by cam, G, would cause pin, O, carrying the needle-bars, to move downwards in such a manner as would tend to form a circle with P as a center. Fig. 15 shows needle-bar with both the motions connected up and standing ready to give to the needle-bar both up and down, as well as backward and forward movements, by the revolving of the cam shaft, H. By lifting the link, J, as shown in Fig. 15, from pin, K, as shown in Fig. 12, the needle-bar will be swung back and forth on O; as seen by dotted line, Fig. 12, its position at O will remain unchanged. Both arrangements are shown, end elevation, in Fig. 17. The perpendicular motion is not disconnected, the requirements of knitting not necessitating it. This motion must therefore always follow the line of the cams when they revolve. In Fig. 14 is shown a needle-bar in position in the arms of the vertical motion apparatus and without the lateral attachments. This probably shows better than any of the other illustrations the lines of the two motions.

(To be continued.)

The trade of India with Tibet, conducted through the Chumbi Valley, during the year ended March 31, 1909, was as follows: Imports, $513,690; exports, $467,445. The principal import was wool, and the principal exports were cotton and woolen goods and earthenware and porcelain.

KNITTING MILL NEWS.

New Mills.

Delaware, Wilmington. With Winsfield S. Hoffman as president and treasurer, and George A. Robinson as general manager, the Rising Sun Hosiery Co. have equipped a plant in the Wawaset Bldg. at the corner of Conrad and Jackson Sts., which is now in full operation.

*Indiana, Fort Wayne. Buildings under construction for Thieme Bros. Co., who will manufacture silk hosiery, will be ready for machinery late in September. All contracts have been awarded.

*Massachusetts, North Adams. Operations will start some time in September in the new plant of the Berkshire Hosiery Co., recently organized with capital stock of $15,000. E. A. Richardson is president and treasurer of the company and Charles Pittle, superintendent. Plant will be equipped with 12 machines for making men's half hose. Will use 40 to 60s yarns.

*New York, Elmira. The Ironwear Hosiery Co. now has an equipment of ten machines. It is reported that they propose erecting a new mill building.

*North Carolina, High Point. Construction work has just been started on the building for the Piedmont Mills Co., and the officers plan to begin manufacturing Jan. 1, with daily production of 1,000 dozens of ladies' and men's hosiery. The authorized capital stock is $125,000, $40,000 paid in. J. H. Adams has been elected president and buyer; J. E. Mills, treasurer; and C. C. Robbins, superintendent. They plan to equip a dyehouse and operate the plant by steam and electric power.

*North Carolina, Penrose. A building has been secured by the Penrose Mfg. Co., and they are installing 100 knitting machines for manufacturing hosiery. In the near future they plan to add spindles to make their own yarns. M. L. Talley is president, and John Cox is one of the directors. The incorporation of this company with capital stock of $125,000 was noted last May.

*North Carolina, Wilson. The Runnymede Mills, No. 3, have been incorporated with capital stock of $62,500 by George Howard and others. Mr. Howard is connected with the Tarboro Knitting Mills, Tarboro, N. C., and it is understood will start a knitting factory.

*Ohio, Painesville. The new knitting mill will be known as the Ohio Textile Co., and is owned by W. C. Hazer, manager of the Mentor Knitting Mills from 1903 to 1908, and W. G. Clother, who was foreman of knitting at the Mentor Knitting Mills up to a few weeks ago. They plan to begin manufacturing men's union underwear with six knitting machines and 8 sewing machines about October 1, buying 9s to 60s yarns in cotton, mercerized and worsted. A fine line of samples has been gotten out, and they anticipate a sufficient number of orders to enlarge the plant in the near future. Mr. Hazer is manager and buyer, and Mr. Clother is superintendent. The plant is operated by electric power.

Pennsylvania, Allentown. The Standard Knitting Co., a new concern, has begun the manufacture of ladies' fine Swiss ribbed underwear on 5 knitting machines at 20 to 30 South Hall St. Elmer Hinkle is president, superintendent and buyer, and Amos O. Kressley is treasurer. The plant is operated by electric power. They plan to make a large increase as business warrants it.

Pennsylvania, Philadelphia. As recently reported by us, the Hadfield Hosiery Co., located in the Coulter Building, Jasper and York streets, have applied for a charter with John Hadfield, David Vetter and William E. Haley as the incorporators. The company has a capital of $5000 and has for its officers John Hadfield, pres. and supt., and David Vetter, treas. The plant will contain, when in full operation, 40 knitters and 5 loopers which will be run on misses' and children's ribbed hosiery of cotton, which they will sell direct. Part of the machinery has been delivered and is now in operation, with other equipment coming in from day to day from Scott & Williams, who are the builders.

Pennsylvania, Philadelphia. A charter has been asked for the Peerless Silk Hosiery Co., with Richard Voit, manufacturer of upholstery goods under the name of the Lindley Mfg. Co., George T. Hunsicker, William Child, Richard Reinhold, formerly with the Cambria Silk Hosiery Co., and Henry Hans Moeller, as incorporators. This company, it is said, will manufacture full fashioned silk hosiery, its equipment having been ordered from a domestic builder of this class of machinery and will probably locate their plant in the new mill now being erected by the Peerless Co., on Willard St., below Kensington Ave.

Pennsylvania, Philadelphia. Chas. S. Weierman, now connected with the Saxony Hosiery Co., Allegheny Ave. and Boudinot Sts., manufacturers of men's and women's seamless hosiery, reports that it is his intention to start up a plant on his own account containing about 70 knitters, which he will operate on split foot hosiery. Mr. Weierman has not as yet secured quarters in which to install the machinery, but expects to have the matter arranged and the machinery in operation by October 15. The equipment of the plant has not yet been purchased.

Pennsylvania, Philadelphia. The Wexler Bros. Knitting Mill has been started up at 125 N. 3d St., with H. Wexler as superintendent and buyer. The plant will contain 10 knitters, four of which are already in operation, and 6 sewing machines, which will be run on ladies', men's and children's jackets, blouses and sporting knit goods. They are buying 2/21 wool, 2/20 worsted and 2/20 cotton yarns. The production is sold direct.

Pennsylvania, Philadelphia. J. C. Lowry, formerly with the late Vassar Knitting Mills of Wilmington, Del., has leased the third floor in the building at 5120 Wakefield St., Germantown, in which he is installing 7 knitting and 6 sewing machines, which he will operate on ladies' ribbed vests, using 28s C. P. and mercerized yarns. The production will be sold through Clift & Goodrich, New York.

Pennsylvania, Philadelphia. The Reis & Smith Mfg. Co., who have recently opened up offices at 229 Race St., for the sale of cardigan jackets, sweater coats and bathing suits, report that they are considering a proposition for the installation of knitting machinery for the manufacture of bathing suits. Should the matter turn out favorably the machinery will be installed in a part of the building where they are now located.

Pennsylvania, Pottsville. On September 15, the Glen Knitting Mills Co. started manufacturing. This is a new concern which will makes ladies' ribbed underwear using 24s yarn. Harvey D. Petry and M. J. O'Connor are the proprietors.

*Pennsylvania, Terre Hill. T. L. Seidel of Reading, Pennsylvania, who will start the new hosiery mill here is installing a 40 h. p. boiler, and making necessary alterations to the building.

*South Carolina, Walhalla. William A. Hetrick is president and superintendent of the Hetrick Hosiery Mills and Charles F. Hetrick, treasurer. This company was recently organized with capital stock of $33,000 and takes over the plant of the Oconee Knitting Mill at Walhalla and the plant of Wm. Hetrick & Bro., Philadelphia. All grades and classes of hosiery are made. Product is sold through Chas. Chipman's Sons, New York.

Tennessee, Winchester. Miller Bros. of this place and W. B. Davis of Davis Hosiery Mills, Chattanooga, Tenn., will establish a hosiery mill here. They plan to use electric power.

Enlargements and Improvements.

*Georgia, Columbus. The Lowell Machine Shop, Lowell, Mass., has been awarded contract by the Georgia Mfg. Co. for 4,160 spindles, which will be installed early in January. A further addition increasing the equipment to 10,000 spindles and 350 knitting machines will be made about the middle of 1910.

Massachusetts, Canton. Draper Bros. Co. are installing a new piece-dyeing machine.

Massachusetts, Lowell. The Shaw Stocking Company is equipping a building formerly used as a storehouse for mercerizing. Hitherto goods have been sent away for this finish.

*Massachusetts, Wakefield. Work is well under way on the new three-story addition for the Harvard Knitting Mills. They will install a dyeing plant and in the future dye their own yarns and product. The new power house will be completed in October and the engines to be installed will double the present motive power.

*New York, Cohoes. The Yale Textile Co. have removed their plant to the building of the Wilson Paper Box Co. on Jackson Ave. and have resumed manufacturing. This change was made to allow of increasing the capacity.

*New York, Elmira. No new equipment will be contracted for as a result of the improvements at

the Elmira Knitting Mills. The only change is the erection of a new storehouse.

New York, Hudson. A 2-story addition, 51 by 125 ft., is being built for the Swansdown Knitting Co. They do not contemplate adding new machinery as the addition is simply to give more space for the present equipment.

New York, New Hartford. The Illma Underwear Co. of 17 Main St., Utica, has purchased a building at this place, and will move here from Utica about December 1. They propose to put in additional machinery. Union suits are manufactured in cotton, silk, merino and worsted.

New York, New York City. The stockholders of the Franklin Knitting Mills will hold a meeting September 27 at the company's office, 359 West Broadway, for the purpose of voting on the proposition to increase the capital stock from $10,000 to $30,000. It is probable the plant will be enlarged. This is a new concern organized early in this year. They manufacture sweaters, sweater coats and knitted neckties. S. Worms is president, and B. F. Baron, secretary and treasurer.

*New York, Perry. D. W. Watson has been elected president of the Lander & Watson Hosiery Co., recently incorporated with capital stock of $25,000 to take over the hosiery business previously conducted by Lander & Watson. James Lander is treasurer and buyer. They operate nine knitting machines on men's and women's hosiery. The business was incorporated with the idea of enlarging.

*New York, Philmont. The Columbia Mesh Knitting Company has discontinued operating the plant nights, so that repairs may be made to the plant and build addition as previously reported.

New York, St. Johnsville. A number of new knitters, a new winder and a press are being installed by the Union Knitting Co.

*New York, Utica. No details of the proposed enlargement of the Albion Knit Goods Co., J. Morgan proprietor, can be given beyond the fact that they have purchased the Bossert Electric Construction Co.'s plant on Gray Ave., and will occupy it next spring, thereby having three times the present manufacturing space.

New York, Warsaw. Manufacturing has been resumed in the Brown Knitting Co.'s plant after a shut down of three weeks, in which a new engine has been installed. Thirty-six new knitting machines have been contracted for and will be set up as soon as the annex is completed.

New York, Waterford. The addition to the Ford Mfg. Co.'s plant has been completed, and is now in use as a finishing department.

*New York, Watertown. The Shaughnessy Knitting Co., previously reported to remove its plant to this place from Amsterdam, will start this work at once. M. J. Shaughnessy is president, treasurer and buyer. Ten knitting machines and 24 sewing machines are operated on women's and children's porous underwear.

*North Carolina, Enfield. An addition to the dyeing department, 16 by 36 ft., and a small addition to the manufacturing department, 20 by 48 ft., have been completed for the Enfield Hosiery Mills and additional machinery is being set up.

North Carolina, Winston-Salem. A new bleachery will be built for the Maline Mills with capacity of 30,000 pounds. Construction contract has been given to J. F. Ange of Winston-Salem, and he will erect a building of brick construction, 60 by 170 ft. Enlargement is to be completed in two months.

Ohio, Hamilton. A new steam power plant is being built for the Miami Valley Knitting Mills. A large addition, underway to the main mill, is expected to be completed in November when a number of additional hands will be employed.

Ohio, Portsmouth. The Scott Knitting Co. will erect a new building in the near future, and will double their capacity in every department. Plans are not fully completed.

*Pennsylvania, Allentown. Construction work has been started on the proposed three-story brick addition to the Swissonia Knitting Mills. When completed the equipment will be increased to 30 knitting machines and 50 sewing machines. J. J. Taylor is treasurer and buyer. The plant is operated by steam power.

Pennsylvania, Dorrancetown. After a shutdown of about one month the Werkheiser Knitting Mills will resume manufacturing. During the past month the machinery has been removed to a new mill just completed.

Pennsylvania, Philadelphia. The Cambria Silk Hosiery Company, located in the Ontario Mills, Second, above Columbia Ave., have recently placed an order for 5 new full fashioned frames which will triple their equipment and enable them to increase their production, which consists of silk and cotton full fashioned hosiery, which they sell through A. W. Wood, New York. The company has enough business on hand to keep it running to its fullest capacity for the next year.

Pennsylvania, Philadelphia. The three-story factory building at the corner of 10th and Norris Sts., recently purchased by Henry Nelke of the Elk Knitting Mills, located in the Fretz Bldg., is to be remodelled and improved. The contract has been placed and contractors are now engaged in the work, which will cost about $7,500.

Pennsylvania, Philadelphia. The Cedar Brook Knitting Mills report that they are dismantling their old building on the Lime Kiln Pike above Washington Lane, Germantown, and are having erected a new two-story brick building with basement, 36 by 70 ft., and a boiler house, 24 by 30 ft., also of brick. In their new plant they will operate 10 knitters and 14 sewing machines on women's cotton ribbed underwear, for which they have many orders and which in a sense, has compelled them to triple the size of their plant to enable them to get out their production. The company has a capital of $25,000. Enoch Holland, pres. and supt., and Albert T. Flavell, treas. The production is sold through Thos. Muir & Co., N. Y.

New Machinery and Processes.

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to textile manufacturers. It is not a list of patents, but of improvements coming on the market. The idea being to present to our readers a systematic monthly record of new machinery etc., of interest to textile mill men.
We invite machine builders and others to send us such information for this department.

Recovery of Mercerized Caustic. The Zaremba Co., 1240 Monadnock Block, Chicago, Ill., are introducing an apparatus for the recovery of caustic from mercerizing liquor. An illustrated description appears in this issue.

Air Compressor. The Gardner Governor Co., Quincy, Ill. A high speed air compressor known as the Gardner-Rix machine, which is illustrated and described in this issue.

Enclosed Arc Lamp. General Electric Co., Schenectady, N. Y., are introducing what is known as the "intensified enclosed arc lamp," which is described in another part of this issue.

Direct Beamer. The Cocker Machinery Co., 4043 Paul St., Frankford, Philadelphia, Pa., are placing on the market a machine for beaming yarn direct from spools to the beam. A description of this machine is given in this issue.

Expelling Electricity. The Chapman Electric Neutralizer Co., Portland, Me., are introducing a method of expelling electricity from workrooms. It is especially adapted for the textile industry. A description appears in another part of this issue.

Cotton Picking Machinery. Potter & Johnston Machine Co., Pawtucket, R. I. Cotton manufacturers will be interested in the announcement by the Potter & Johnston Machine Co. that they have engaged in the manufacture of high class cotton picking machinery. The excellent reputation of Potter & Johnston's product will be maintained in the building of the picking machinery as regards both workmanship and material. Attention is called to the announcement in our advertising columns.

Oil Separator. Gustav Adolph, Mainz, Germany. A machine for extracting and recovering oil from cotton waste and other materials used for cleaning engines and machinery.

Thread Counter. Chas. Lowinson, 395 Broadway, New York. A thread counter in which the glass is moved by a screw, the distance being indicated on a scale so that the threads for any given length can be counted.

Shuttle Threader. Emil Gminder, Reutlingen, Germany. A shuttle threader designed to do away with the practice of sucking yarn through the eye of the shuttle. It consists of a hand hook resembling a spring needle, such as is used in knitting.

Drying Cylinder. Rigby & Mellor, Bury, England. A drying cylinder with an improved bucket for removing condensed steam.

Warping Machine. Willan & Mills, Blackburn, England. An improved warping machine in which the nip roller is driven by a belt, obviating the use of the upright shaft and gearing. The machine is equipped with a special starting motion to prevent it from being started suddenly. When being reversed there is no movement of the nip rollers.

Velvet Cutter. Paul Hertzog, M. Gladbach, Germany. A cutter for a velvet loom for which accuracy and a large production are claimed.

Traverse Motion for Winding Frames. Hacking & Co., Bury, England. An improved traverse motion for winding frames. It is operated by a cam, but improvements have been adopted, which it is stated, make it more positive than the ordinary cam motion.

THE FRANKLIN DYEING PROCESS.

Frederick H. Daniell, agent for the Sulloway Mills, Franklin, N. H., and John C. Hebden of Providence, R. I., a well known chemist and expert in dyestuffs and dyeing processes, have recently perfected a new system of dyeing. The apparatus is shown in the accompanying illustrations and the inventors claim that, as shown in Fig. 1, it provides a complete dyehouse in one machine.

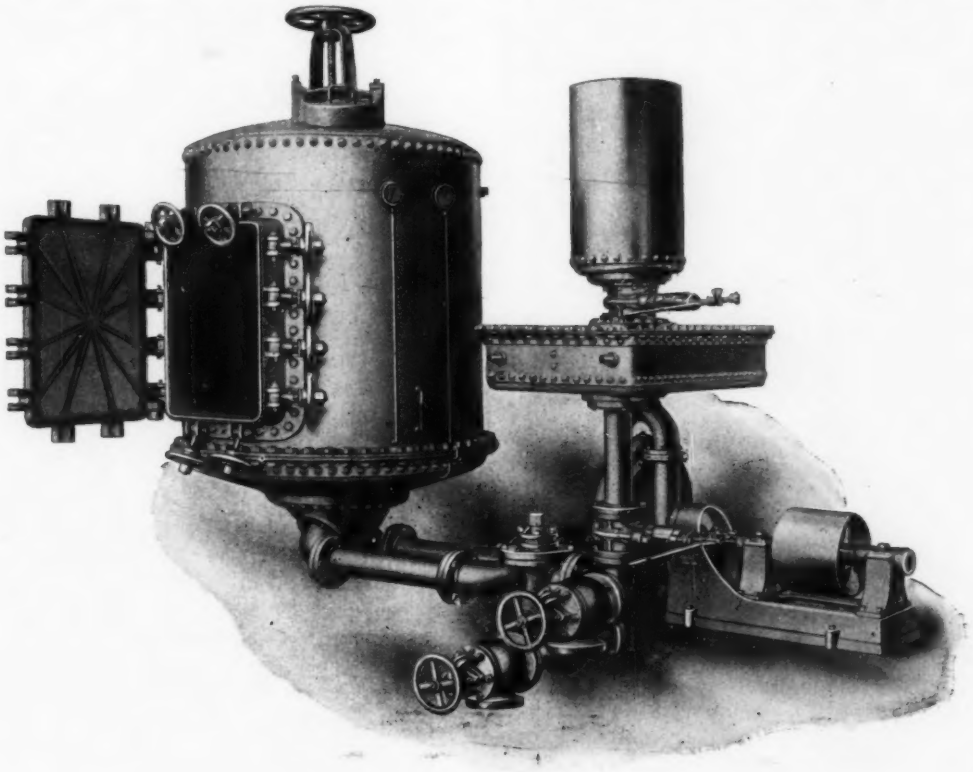


FIG. 1. THE FRANKLIN DYEING MACHINE.

OBJECT OF THE NEW PROCESS.

The object of the system is to manufacture colored goods with the same winding processes used for grey goods. This is accomplished by dyeing yarns in packages which correspond to a six-inch spool, a jack-spool, a small ball warp, or by dyeing on hollow bottle bobbins. By eliminating the transfer processes of skein winding and all rewinding operations connected with the use of ball warps a remarkable saving is made in labor cost. It is claimed that machines now in operation in several mills have demonstrated a saving of 75 per cent. in labor cost and from 25 to 30 per cent. in dyestuffs. A further advantage is gained in the drying process, no hydro-extractors being required.

The process is applicable to cotton, wool and worsted yarns, either single or ply, and also to the dyeing of fibers before spinning, either in the top, lap or card-ball. Raw stock or finished yarn in any form can be dyed in the same machine, it is stated, something never before accomplished with other dyeing systems.

It can be used on all colors on cotton: direct, diazotized and developed; Sulphur

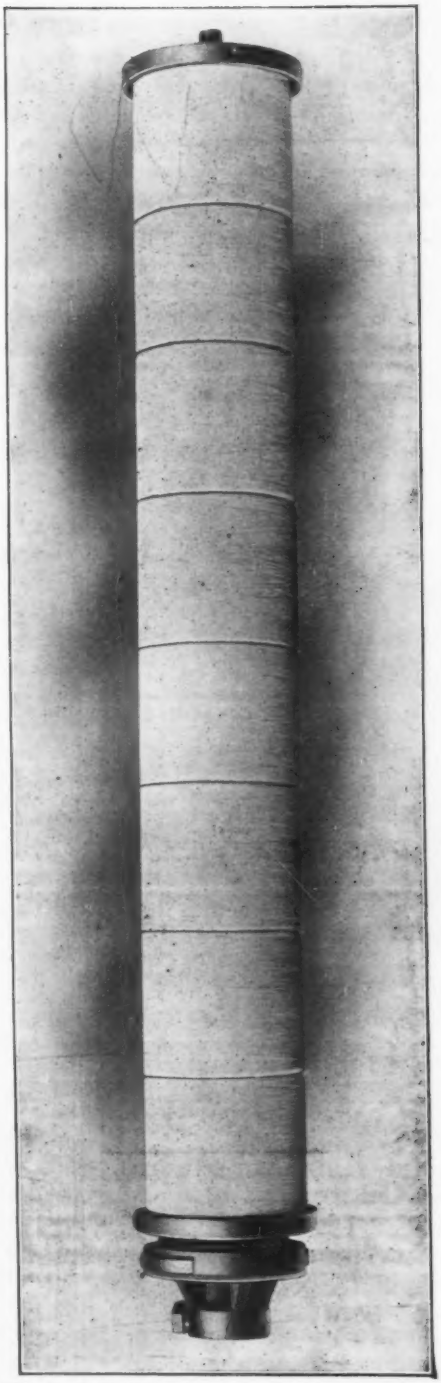


FIG. 2. PARALLEL PACKAGES OF YARN ON DYEING UNIT.

FIG. 3. LAP ON UNIT HOLDER READY FOR DYEING.

colors, vat and Indanthrene colors; and it is claimed that uniform level dyeing can be obtained under all conditions, and batches matched perfectly to sample.

On worsted and wool, acid dyes, mordanted, after-chromed dyes and dyes produced with chrome in the bath are worked to equal advantage.

The apparatus consists of a kier arranged with a diaphragm or false-bottom and having both the upper and lower chambers connected by an organized system of piping leading from a centrifugal pump through a four-way valve. The pump is connected to exhaust the square heating chamber, Fig. 1, the latter being surmounted by a cylindrical mixing tank leading into it. The dye liquor is poured into the mixing tank and feeds into the heating chamber where it is heated to the proper temperature through the use of a steam coil. The four-way valve can be set to cause the pump to force the liquor either into the upper or lower chamber of the kier. During the circulation of the fluid through the yarn in the kier and back into the heating chamber a small flow is bled from the discharge of the pump through a pipe which discharges into the mixing chamber to cause a stirring action and keep the liquor properly mixed.

COMPRESSING THE MATERIAL.

The essential and novel feature of the new system is the method of holding the packages of material under compression to secure a uniform density of the whole mass during the dyeing process. This is accomplished by the use of compressible tubes on which the material is wound, the packages being strung on to skewers or stringers end-for-end between flanges which are forced together to compress the whole mass. In other methods of dyeing the yarn under compression, where it has been attempted to compress the packages wound on rigid tubes, a uniform density could not be secured because the ends of the tubes would butt against each other and prevent compression. Furthermore, the coils of material adjacent the tube would be disturbed and the regularity of the winding destroyed so that after the dyeing the yarn would not deliver properly.

The tubes used for supporting the packages of material in the present system are porous to allow the flow of the fluid from the inner channel of the package radially out through the surrounding yarn mass, and are designed to contract longitudinally under end pressure. Fig. 2 illustrates a stringer with eight packages of yarn strung on to it and held under pressure between the end flanges. The stringer is formed of angle

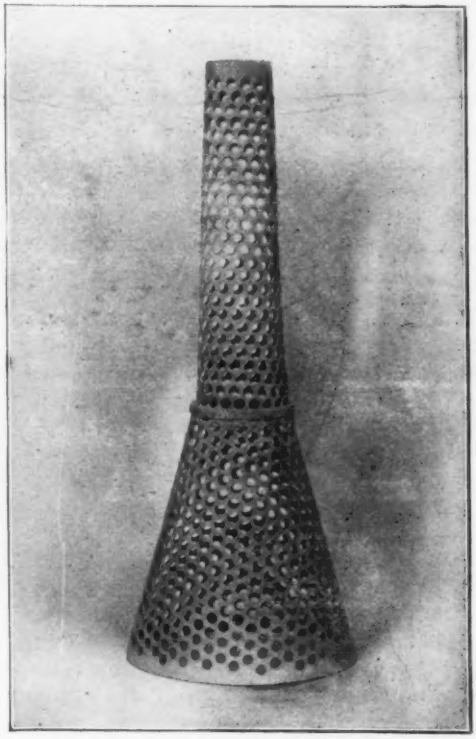


FIG. 4. FRANKLIN KNITTING BOBBIN HOLDER FOR DYEING.

iron to give a three-point bearing within the tubes and at the same time provide for a free flow of the liquor through them. When the end flanges are brought toward each other under pressure the several packages are pressed together into one tubular mass with all parts compressed to a uniform density. The liquor is forced through the central channel of the packages from one end, with

the other end closed, and will radiate out through the walls of the tubes to permeate the whole mass. The ends of the packages being held tightly together, there will be no escape for the liquor and all portions of the mass being held under the same compression there is a thorough permeation and, consequently, a uniform color results. When the packages are removed from the stringers, after the dyeing, the tubes expand to their original length and the yarn is in the same condition as when first wound. The winding is not disturbed in the least degree, and therefore the packages deliver perfectly so that the yarn can be taken off at high speed.

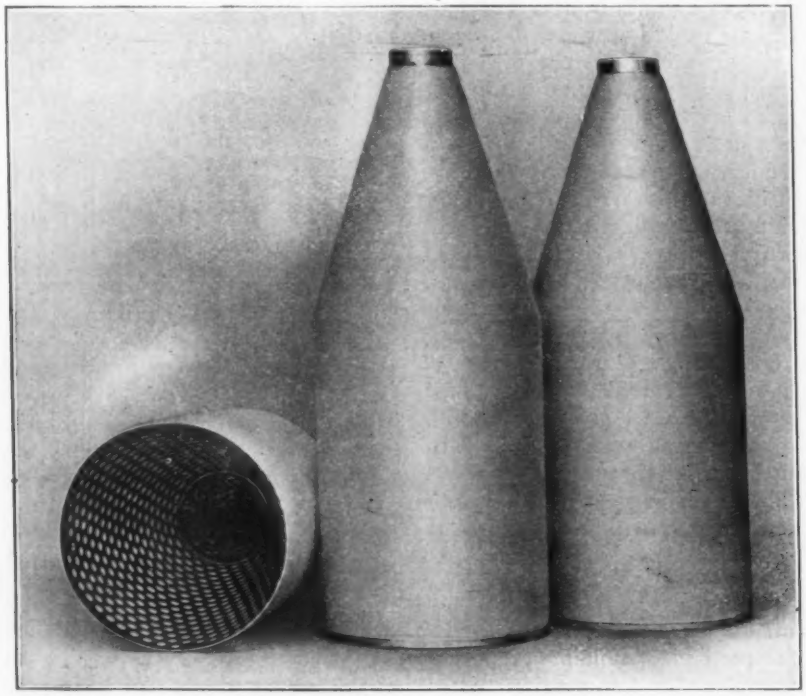


FIG. 5. FRANKLIN KNITTING BOBBINS WOUND ON HOLLOW PERFORATED HOLDERS.

PACKAGES HANDLED IN UNITS.

The packages of material assembled on the stringers form convenient units for handling, and the kier is adapted to take from one to fifty of these units which are arranged vertically in concentric circles within the kier. The lower flanges on the units screw into openings in the false-bottom of the kier by means of a breech-block device, and the upper extremities of the units are held by a sliding head which is moved down into contact with the upper flanges by means of the hand-wheel shown on the dome of the kier. The units are placed in the kier through the door on the front side. One of the units is free from the supporting head and a sample may be unwound and removed through the hand-hole in the top of the kier for taking off test samples during the dyeing operation.

OPERATION OF THE MACHINE.

The dyeing liquor is pumped from the heating chamber into the lower chamber of the kier and forced up through the false-bottom into the interior channels of the packages held in the units. The liquor cir-

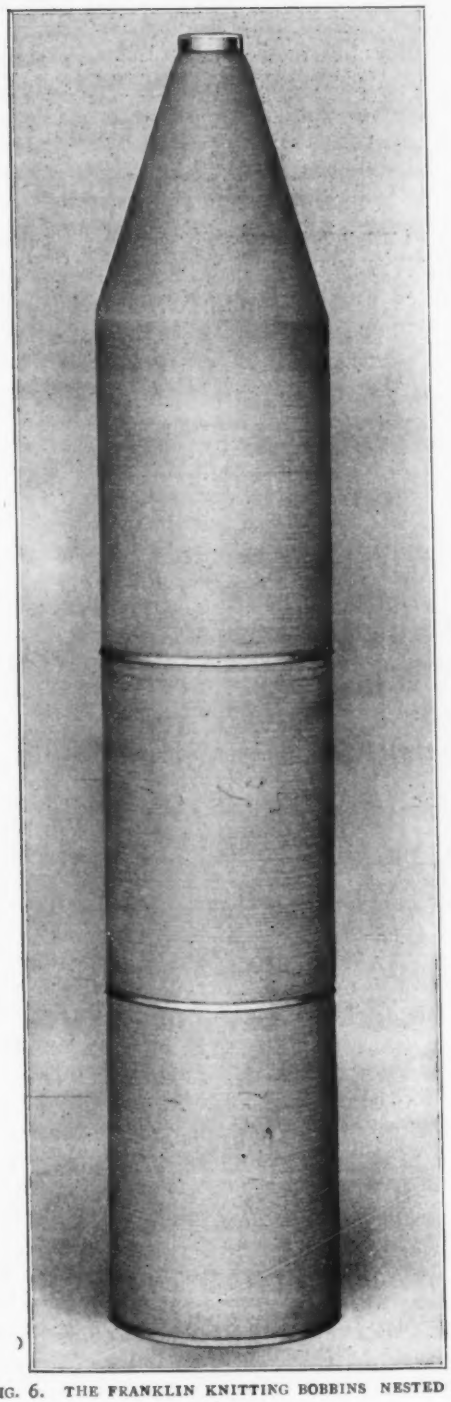


FIG. 6. THE FRANKLIN KNITTING BOBBINS NESTED FOR DYEING.

culates through the yarn masses into the upper chamber of the kier and exhausts back into the heating chamber. The circulation can be kept up as long as necessary to give the proper shade. The circulation of the liquor is reversed at regular intervals by changing the four-way valve. By the reverse method of circulation the liquor is pumped into the upper chamber of the kier and forced through the masses from the outside, exhausting down through the channels into the lower chamber of the kier and thence back into the heating chamber.

The yarn may be washed in the kier by using water in place of the liquor and the water can be forced out of the material with the same system without the use of hydro-extractors.

The unit shown in Fig. 2 illustrates parallel tubes applied to the stringer and this same form of holder is used for yarn wound on jack-spools or in ball-warps. A special form of jack-spool has been invented to provide for the contractible feature which allows the compression of the yarn mass in an axial direction. Fig. 3 shows the method of applying a lap, top, or card-ball to the holder. When the material to be dyed is in the form of fibers an outer contractible covering is employed to prevent the distortion or disintegration of the material.

YARN DYED ON BOTTLE BOBBINS.

To carry the system still farther, the inventors have devised a hollow bottle-bobbin shown in Fig. 4. The yarn is wound on these bobbins in the form shown in Fig. 5, and the bobbins are assembled in units by nesting them together, as illustrated in Fig. 6. A special form of base and cap are fitted to the ends of the bobbins, and when pressure is applied the yarn can be compressed in this form exactly the same as when contained in parallel packages.

The various devices of tubes, bobbins, and apparatus, as well as the method of dyeing, are protected by patents (basic claims having been already allowed in the United States) filed in all of the principal countries.

IMPROVED RESULTS ACCOMPLISHED.

The practical working of the system described above in one mill for over a year has demonstrated, it is stated, that the saving in winding expense and waste have paid for the complete installation and left a profit to the mill.

The colors produced on worsted yarns are said to meet the highest requirements for uniformity of shade and fastness of color. Single worsted yarn can be dyed as easily as two-ply, making the process particularly useful for dress goods and knitting purposes. Wool yarn can be dyed without felting or fulling.

It is claimed that yarn dyed by this system

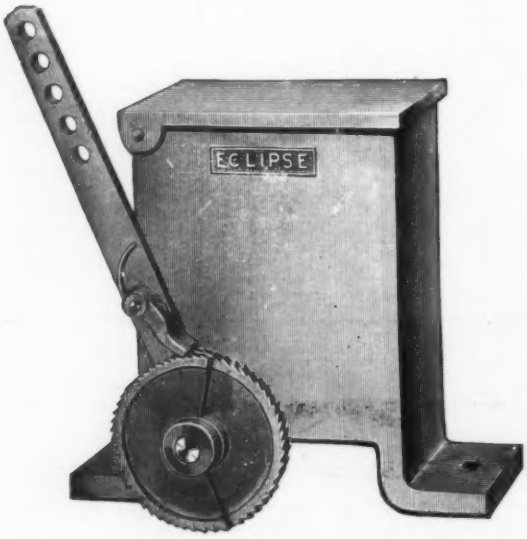


FIG. 1.

is improved in quality, owing to the fact that the twist is set by having the yarn held securely in the packages. Furthermore, the strength of the yarn is increased, because the various processes of handling in rewinding and working are eliminated, and the yarn is not pulled down or the original twist disturbed.

The complete apparatus occupies a very small floor space, is self contained, and, owing to the unique construction, entirely eliminates the steam nuisance to be found in all dye houses.

The new apparatus is called the Franklin Dyeing Machine and is being exploited by the Franklin Process Company, P. O. Box 465, Providence, R. I. The selling agents are F. E. Atteaux & Co., Incorporated, 176 Purchase St., Boston, Mass.

THE ECLIPSE OIL PUMP.

This oil pump shown at Fig. 1 is manufactured by the Eclipse Oil Pump Co., Vicksburg, Mich., and has several features which would commend it to users of oil pumps.

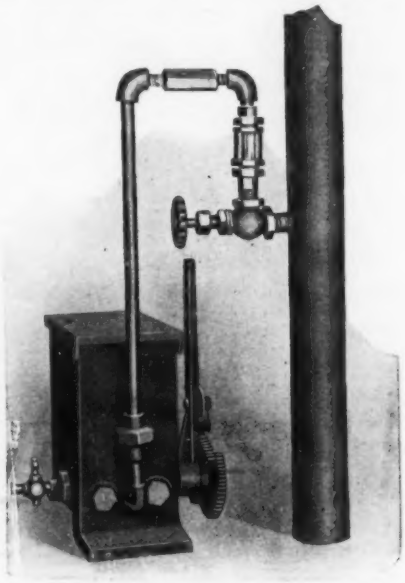


FIG. 2.

Among these is the absence of cranks, eccentrics, connecting rods, plungers, stuffing boxes, valves and packed joints. It is very simple in construction and feeds positively any kind of lubricating oil under all ordinary conditions against any steam pressure. Special care is taken in the selection of material for making these pumps, all working parts being finely ground finish.

The feed is increased or diminshed by changing the position of the driving rod on the pump lever. five holes, as shown, being provided for this purpose.

Fig. 2 shows the pump connected with a

steam pipe and with the sight feed attachment. It is made in two sizes, for medium and high duty, respectively. The former is guaranteed to work under 300 pounds pressure and the latter under 600 pounds. The manufacturers claim that it will last as long as the engine and without repairs, and they will be pleased to furnish the trade with any further information desired. This company also builds the Judson three ball governor which is in successful use throughout the country.

EXPELLING ELECTRICITY FROM FABRICS.

BY W. H. CHAPMAN.

For centuries it has been known that fur, wool, silk, paper and a great many other substances become charged with electricity when subjected to friction or pressure, and such substances have been classed as insulators because they hold a charge of electricity for a considerable time. As a sponge or piece of blotting paper soaks up water and retains it until slowly dried out, so these substances pick up charges of electricity and retain them for minutes or hours or days according to the condition of the atmosphere. In a dry atmosphere the charges are held longer than in a humid atmosphere. Humidity, therefore, has been the chief weapon with which to fight the evil, but in the rapidly moving machinery of modern times the generation of frictional electricity is so very rapid that humidity is inadequate to cope with it even when assisted by high temperatures. What is needed is something to act forcibly and to instantly expel it.

There are woolen mills that maintain a temperature of 90° to 100° F. and a humidity of 70 to 80 per cent. in the effort to kill the electricity. The high temperature being used because a greater weight of water per cubic foot is thus held suspended in the air,

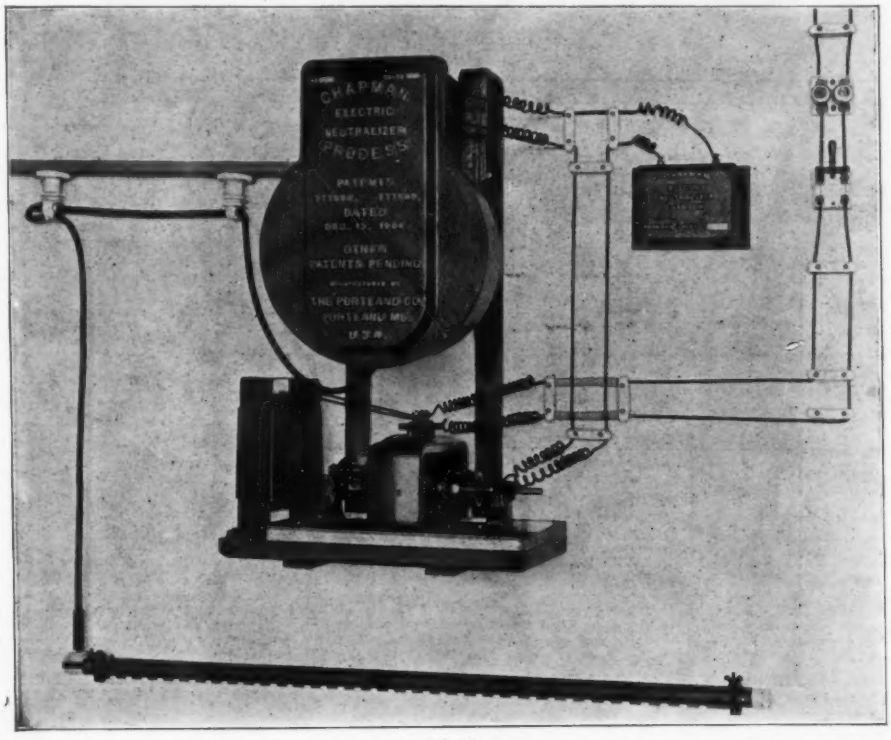


FIG. I.

but even under these uncomfortable conditions there is a production of electricity in the stock which is quite troublesome.

Frictional electricity makes trouble in a woolen mill in many ways. Some of them are as follows:

In the card room the roving comes from the finisher card highly charged and often sticks to the rub rolls and winds up around them, causing much waste and loss of production. The individual fibers of the roving are repelled from each other and so a rough torn sliver and uneven yarn is the result. A sliver in which the fibers are pushed apart by electrical charges spins very poorly and leaves soft spots in the spinning if it does not break.

In shearing machines or brushing machines the cloth becomes highly charged by the friction of brushing and the flocks and dirt are attracted to its surface and cannot be brushed out. The more it is brushed the more the dirt flies back and sticks. The cloth itself also frequently sticks to the

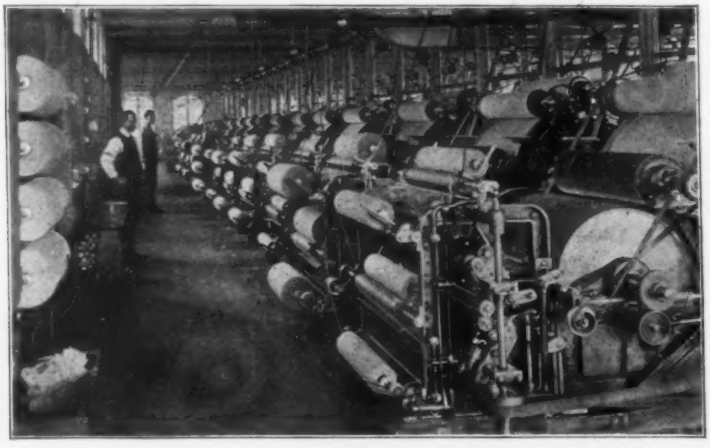


FIG. 2.

FIG. 3.

apron of the machine and is carried away from the pile on which it is supposed to fold up.

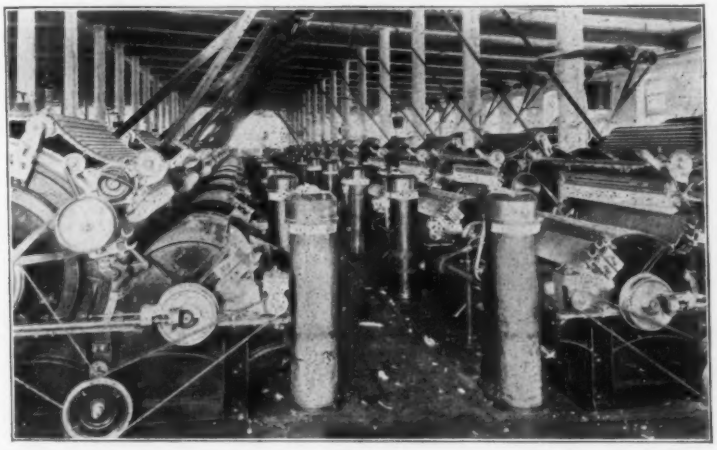


FIG. 4.

The effects of frictional electricity in a cotton carding room are conspicuous in the tearing and breaking apart of the web of cotton as it comes from the doffer cylinder, and in its separation as fly in the air. A large amount of waste is the result, especially during the first two hours after starting the mill in the morning. Bleached and colored cotton are particularly troublesome in this respect.

High temperature and humidity have been generally recognized as a necessity in carding rooms and the benefit derived therefrom is due to the fact that these carry away more or less of the frictional electricity that is present, but they are slow and incomplete in their action at best. The only known method

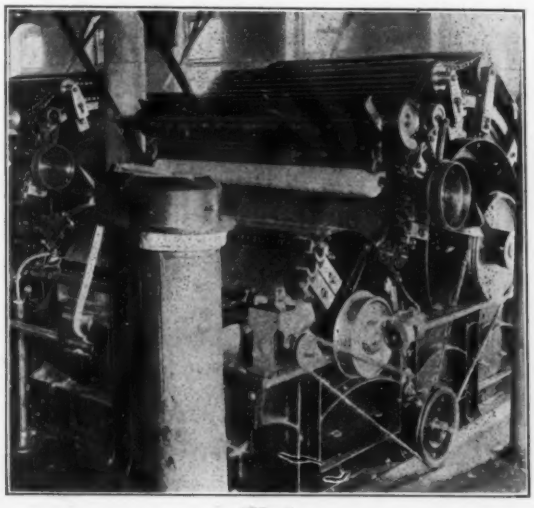


FIG. 5.

for the instantaneous and complete removal of electricity from the stock is to force the process by an alternating current. The Chapman neutralizer embodies this principle.

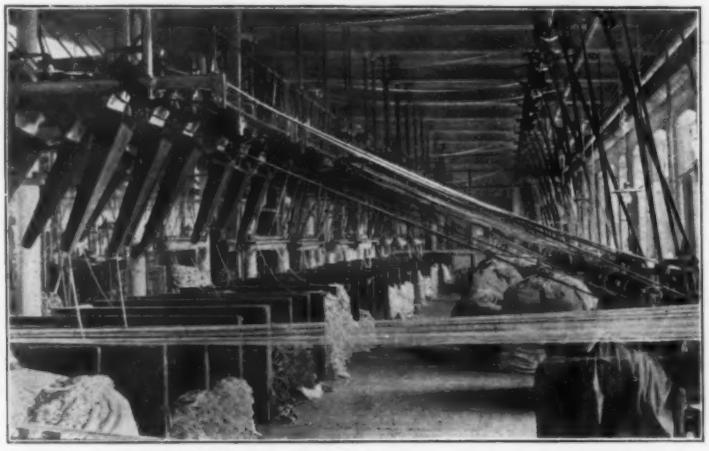


FIG. 6

The essential part of this device is a steel tube called the inductor 1 1/2 inches in diameter, slotted from end to end and of any length to correspond with the width to be treated. Through the center of the tube is a heavily insulated cable connected with a suitable alternating current generator capable of supplying a dozen or more inductors. One inductor is used on a cotton card, and two on a woolen card. Each inductor becomes surrounded with an ionized atmosphere extending several inches around it and this atmosphere is intensely active in driving to earth the charge of any material coming within its range. The atmosphere surrounding the tube is filled with positive and negative ions which force this process and are not mere passive floating carriers of the charge as is the case with humidified air. The process, therefore, is more than a substitute for humidity, and actually forces the result completely and instantaneously. The electric neutralizer system is an ozone producer and purifies the air throughout the room where it is in operation.

FIG. 7.

Fig. 1 shows the complete generating outfit and one of the inductors.

Fig. 2 shows the carding room in a well

known woolen mill. There are 20 sets of cards in this room equipped with the Chapman neutralizer, which has been in service there for three years and has taken the place of vapor pots and steam jets formerly used, and also accomplished a reduction of temperature in the mill from 90° to 70°. On each finisher card an inductor is placed over each set of rub rolls about 3 inches from the roving.

Fig. 3 shows the card room of the Wanskuck Co., with 13 finisher cards equipped with two inductors each. One drop cable from overhead supplies the two inductors with current from the main line which connects with the transformer at the middle of the room.

Fig. 4 is a view of a line of cotton cards with neutralizers attached in the York Mfg. Company's mill. Fig. 5 is a nearer view of one of these cards in which the inductor may be clearly seen above the doffer where it treats the web of cotton as it comes from the doffer cylinder. From one end of the inductor a connecting cable passes in a pipe through the floor where it connects with the main line, supplying all the machines with the proper current to perform the process.

Fig. 6 shows a line of yarn unwinders in the same mill. Inductors are placed at the upper end of the hoppers of these machines and the yarn drops down free from electricity, so that sticking or tangling is entirely prevented.

Fig. 7 is another view in the York Mfg. Company's mill showing the inductors applied to the drawing frames, where it overcomes the sticking and tearing of the roving as it goes through the horns into the roving cans.

I have shown here only a few of the many applications that have already been made of this system in textile mills, but from these it will be readily understood that it is only necessary to pass the fabric in any form within the field of influence of one of these inductors to have it rendered free of all static electricity, and under its influence fabrics can be handled just as well in a dry cold atmosphere as they can in a hot and humid atmosphere.

The Chapman Electric Neutralizer Company of Portland, Me., own the patents and supply all the apparatus for this new process and their advertisement will be found in another column.

MECHANICAL STOKERS.

The fact that with a mechanical stoker a fireman of ordinary ability can do first class work has led to the production of several types of stokers. With the underfeed type, green or uncoked coal is fed beneath coked and incandescent fuel by being pushed forward into a horizontal retort extending longitudinally the length of the furnace. The chief advantage of this type is the smokeless furnace, the gases from the green coal mixed with air passing through the incandescent coal and becoming completely burned. Another feature contributing to complete combustion is the formation of an arch by the burning coal which prevents the cool tubes or plates from reducing the temperature of the gases below the ignition point.

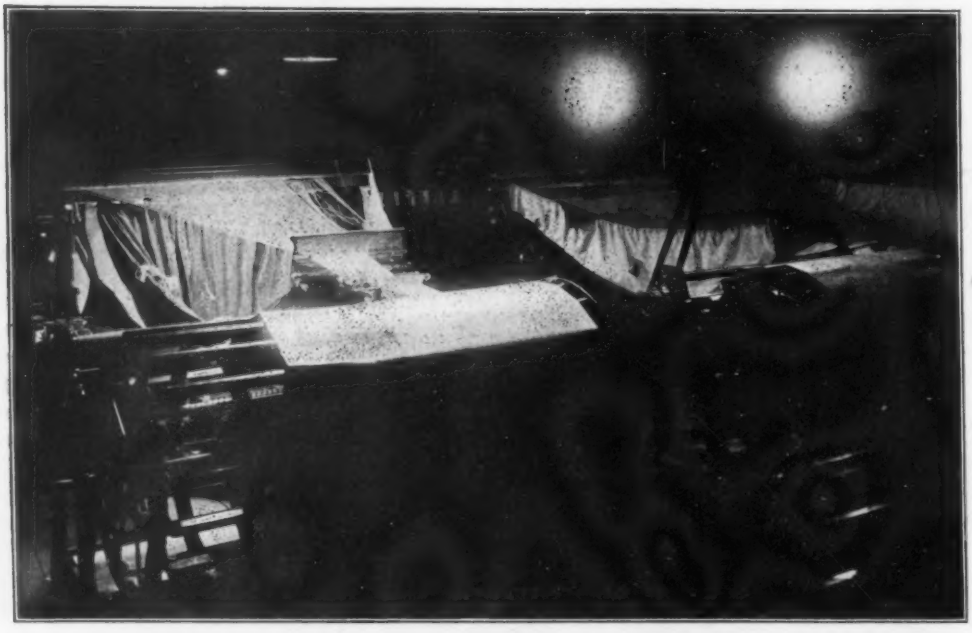
There is another type of mechanical stoker, the overfeed with inclined grate or with a chain grate. With this type the coal from the hopper is forced by a pusher onto the inclined grate, passing beneath a coking arch. Movement of the inclined grate causes the coked fuel to slide down the incline to the dumping plate at the rear. When the fuel reaches the dumping plate it has been reduced to ash, clinker and some coke. This type has the advantage of the dumping plate at the rear, and the action of gravity, but it has the disadvantage of heating the green fuel from below which action causes the formation of much combustible gas. Without expensive arches the gas is liable to escape without burning, thus causing loss of heat. Another disadvantage lies in the air supply—since the gas is liberated at the top, air must be supplied above the fire, and as this is difficult of regulation, an excessive amount is usually admitted.

From the foregoing it is apparent that each type has its advantages and its disadvantages. The advantages of both are well combined in the Taylor underfeed gravity stoker, which, it is stated, is the only mechanical stoker in which green or uncoked coal is fed beneath coked fuel in a furnace with stationary inclined tuyeres. This device is made by the American Ship Windlass Co., of Providence, R. I.

LIGHTING EXPERTS FOR TEXTILE MILLS.

The Buckeye Electric Company of Cleveland has recently opened an industrial light department under the personal supervision of J. M. Smith, an expert on textile mill lighting. The new department will consist of six men, including two illuminating engineers, all of whose services are offered free to mill owners who desire to have their lighting systems made as efficient as possible. Mr. Smith is a thoroughly practical man in this work, in which he has gained an enviable reputation. He had a number of years experience in mill work before he became interested in the subject of illumination and is therefore well qualified to handle mill lighting problems from the standpoint of the mill man as well as from the technical side.

The Buckeye Company, in entering upon this specialized work, has made arrangements to secure practically the output of a prominent reflector house, and proposes to make complete lighting installations. Some striking results have been already secured. It is claimed that in one case the use of Buckeye Tungsten lamps and a special reflector effected a saving of over 60 per cent. in the current consumption while giving over 200 per cent. increase in useful illumination. It is stated that this installation, shown in the illustration, is only typical, as practically equal results can be secured wherever the new equipment, properly installed by the Buckeye experts, is put in place of carbon lamps with ordinary flat or cone-shaped shades.

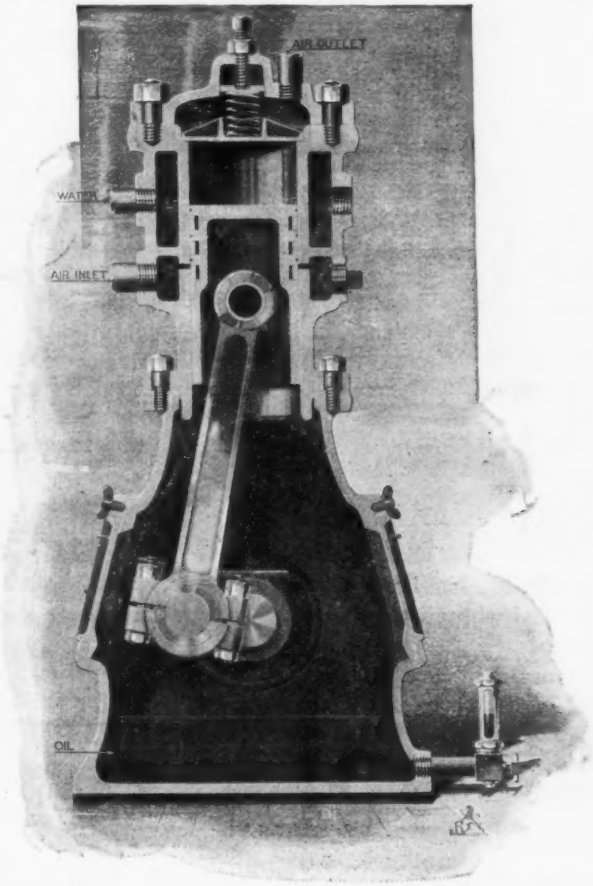


SHOWING THE DIFFERENCE BETWEEN OLD STYLE EQUIPMENT AND BUCKEYE TUNGSTEN LAMPS WITH CORRECT REFLECTORS.

"It is not so much a matter of saving current or getting more light," said Mr. Smith in talking of his new work, "but the increased yardage and better quality of work which can be turned out with proper light makes the Buckeye proposition one of extreme importance to every mill man."

THE GARDNER-RIX HIGH SPEED AIR COMPRESSOR.

Users of air compressors will be interested in the machine built by the Gardner Governor Co., Quincy, Ill., and which is shown in the accompanying illustration. The leading feature of this compressor, aside from its high efficiency, is the simplicity of construction. There are very few parts and practically no attention is required except to keep the crank case supplied with oil. The builders state that it can be placed in the hands of an inexperienced operator or in an inaccessible location with every assurance that its efficiency will not become impaired through inattention or neglect. Aside from filling the oil-chamber occasionally, the machine practically takes care of itself. The ability to obtain efficient results under adverse conditions should appeal to the users of compressors as of primary importance, for generally machinery of this class requires constant care and attention to insure satisfactory results.



A SECTIONAL VIEW OF THE GARDNER-RIX HIGH SPEED AIR COMPRESSOR.

Some of the features especially commendable in this type of compressor may be enu-

merated as follows: Enclosed type, self-oiling, dust-proof and noiseless; splash oiling system, lubricating every part thoroughly; no lubricators, grease or oil cups necessary; no stuffing boxes to pack; no crossheads to key up; bearings are all white bronze renewable sleeves; absolutely no clearance in the air cylinder; requires small floor space and is light in weight; being high speed, it can be connected direct to the motor and the cost of a countershaft is avoided.

The sectional view, shown in the illustration, shows the interior arrangement of this compressor and will enable a clear idea of its operation to be formed. The air is admitted through an annular port in the air cylinder, located at the lower end of the piston travel. The smallest size, 3 by 3 1/2, has no inlet-valve; the other sizes have inlet-valves in the air pistons. The air piston is of the trunk pattern, equipped with spring rings and is single acting, that is, it compresses the air on the upward stroke only. The discharge valve is a flat casting and seats on the top end of the cylinder. The air piston completely fills the cylinder on each upward stroke, so there is absolutely no clearance and the highest volumetric efficiency is attained.

The frame or crank-case is of the enclosed type with convenient hand-hole plates on rod boxes. In these plates are fitted glass bull's eyes so that the attendant or operator may look into the interior and observe the oil level, also the oil splash. The lower part of the crank-case is filled with oil to such a height that the agitators on the crank-case dip into this oil at every revolution, splashing it to every part of the crank-case and lubricating every part of the machine. This lubrication is so thorough that the use of lubricators or grease-cups is entirely dispensed with. There is not an oil-hole in the compressor.

The crank shaft, piston, piston-rings and discharge valves are all ground to an accurate fit. The piston-pin is of hollow steel, hardened and ground. The crank shaft and connecting-rod are steel forgings. All bearings in the compressor are white bronze renewable sleeves, and can be easily replaced when worn. The air cylinder is water-jacketed.

When desired, a suction unloader is furnished, which cuts off the supply of air to the compressor whenever the desired pressure is reached, maintaining a constant air pressure in the receiver at all times. This compressor can be belted direct from the motor, thereby saving the expense of a countershaft. It requires but little floor space and is light in weight.

Users of compressors will appreciate the fact that there is but one inlet and one discharge valve with each of these machines. The outlet valve is practically indestructible, while the inlet valve is of thin sheet steel, easily replaced at slight expense.

JACOBS PICK ARM STRAP FOR NORTHROP AND CROMPTON & KNOWLES LOOMS.

An invention of distinct value to the cotton weaving industry is a new pick arm strap for the shackle, stirrup or pick arm of Northrop and Crompton & Knowles looms, which has just been invented and patented by the E. H. Jacobs Mfg. Co., Danielson,

Conn. It has always been conceded by weaving experts that the short or pick arm lug strap was a very extravagant part of the loom and a source of great expense. For years experts have been working on this strap and it appears that Jacobs Pick Arm Strap has solved the problem.

As can be seen by the accompanying illustration, the concave plug, made from army duck, fits the casting of the pick arm and gives a greater bearing for the picking motion. The strap cannot break out, for all the strain, wear and pull comes on the plug, which will wear for years.

RECOVERY OF MERCERIZING CAUSTIC.

Users of the mercerizing process will find it to their interest to investigate the advantages offered by the Zaremba patent evaporator, built by the Zaremba Company, 1240 Monadnock Block, Chicago, Ill., for the concentration of wash waters and the recovery of caustic soda. This evaporator is the outgrowth of long experience and has been thoroughly tried out in practice. It is claimed that it combines the structural advantages embodied in the cylindrical shell of the old style vertical-tube evaporator with the great heat transmission afforded by the horizontal-tube machine; at the same time it is entirely free from the complex piping and attachments required by the film-type apparatus.

The Zaremba evaporator belongs to what is known as the submerged tube type in which the tubes of the heating surface are submerged in the caustic liquor, the steam being carried inside the tubes. The heating surface is made up of seamless steel tubing carried in a heavy cylindrical shell. The tubes are held in place by elastic gaskets and packing glands, making it possible to easily remove them at any time.

In the construction of the shell the number of joints is reduced to a minimum, a great advantage where caustic is involved.

THE ZAREMBA MACHINE FOR RECOVERING MERCERIZING CAUSTIC.

The vapor space above the boiling liquor is given ample height, preventing loss of caustic by entrainment; as a further safeguard in this direction internal catchalls are provided. The use of large peepholes in the machine, together with internal electric lights, renders the interior of the evaporator perfectly visible and gives the operator knowledge of its action at any time. The builders state that improper operation can be due only to carelessness.

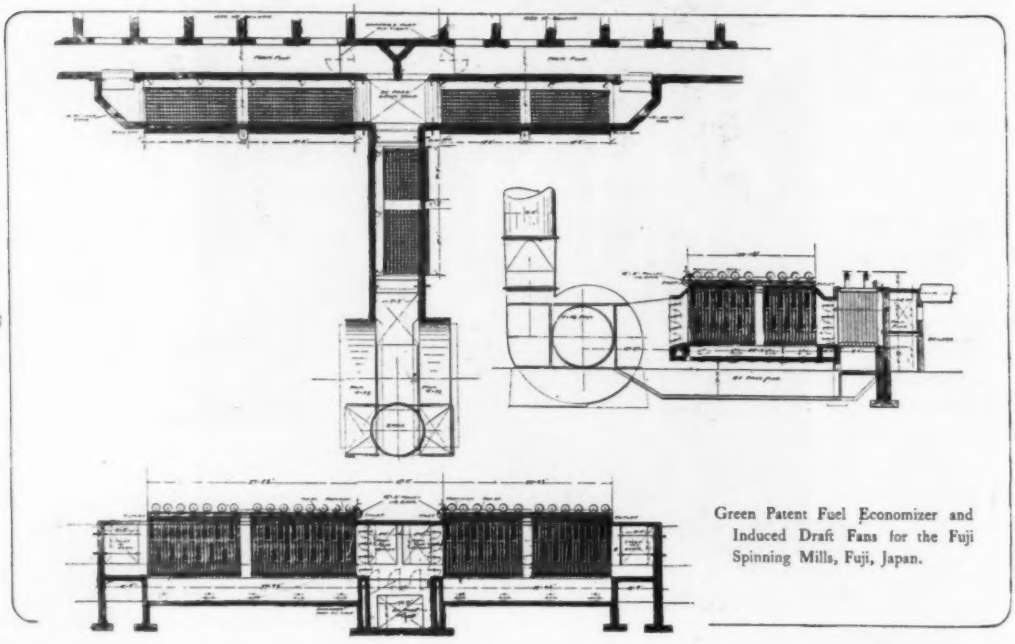
These machines are built for any capacity, running from 100 to 10,000 gallons per hour. To secure steam economy they are furnished

in any desired number of multiples. The illustration shows a quadruple effect which will produce an evaporation of four pounds of water per pound of steam where the liquor is fed hot. Where exhaust steam is available the apparatus affords an ideal opportunity for its efficient use, a non-condensing engine working in conjunction with a vacuum evaporator being far more efficient than a turbine installation. The steam, after condensation, is returned to the boiler as feed water at 212°.

cerizers are requested to send data as follows to the Zaremba Company: Initial density of feed liquor; amount of liquor daily; amount of exhaust steam available.

THE MONEY ECONOMY OF FUEL ECONOMIZERS.

The Green Fuel Economizer Co., Matteawan, New York, have prepared a very interesting statement on the money economy of fuel economizers, from which we take the following: The profit from an economizer



Green Patent Fuel Economizer and Induced Draft Fans for the Fuji Spinning Mills, Fuji, Japan.

The cost of evaporation will depend entirely on the density of the feed liquor and the nature of the steam supply, the labor cost being very low and the maintenance charges practically nothing, due to the great simplicity of the machine. In some mercerizing mills where evaporators are used it is found necessary to make several successive runs of liquor in order to bring it to the proper density. The Zaremba evaporator brings the caustic to the proper density at one passage. By the use of a density tester the discharge is effected at the right point.

To secure the cost of soda recovery mer-

due to the heat saving is the value of fuel saved, labor saved and steaming capacity gained above the interest on the first cost plus the cost of upkeep. The fuel saving can be calculated beforehand. Theoretically, that is, considering only the heat contributed directly by the economizer, it amounts to nearly 1 per cent. of fuel for each 11° that the water is raised in temperature by the economizer, since to make steam at 100 lbs. pressure from feed water at 60° F., for instance, requires 1,137 British thermal units.

Fuel records taken before and after putting in Green fuel economizers have shown

savings as high as 1 per cent. of coal for each 7° or 8° that the feed water is heated, so that if the rise is 150°, which is not unusual where the boilers and fire are driven at a high rate, the actual saving amounts to about 18 per cent.

With the flue gases leaving the boiler at a temperature of 650° F., the economizer may heat the water up to the boiler evaporation point. This temperature of the flue gases implies about 5.8 sq. ft. of surface in the boiler per horse power developed and is by no means exceptional, since boilers have been sold on ratings of 7 sq. ft. per horse power and boilers installed on a much more conservative basis are often brought up to this rating to meet the growth of the business. A boiler of good design will make steam at this rate without priming, but not economically, as the high flue temperature indicates. Good economy requires either more boiler surface or a Green fuel economizer. How much the economizer can save under such conditions is shown by the results quoted below:

At the Daubhill Brickworks, Bolton, the average flue temperature was 650° F. The economizer raised the feed temperature from 52.1° to 259.5°, thus saving 21 per cent. of the coal. At the works of Dickens & Heywood, Middleton, the temperature of the flue gases was 656.25° and the economizer was able to raise the feed from 59.6° to 301°, saving 24.7 per cent. At the paper mill of A. Scott & Sons, Oldham, the temperature of the flue gases was 721.6°, the feed was raised from 50° to 291° and the saving was 26.18 per cent. At the Manchester Union Warehouse a flue temperature of 675° was found, which made it possible to raise the feed from 113.3° to 282°, giving a saving of 20.2 per cent.

The economizer in the plant of A. Scott & Sons contains 216 tubes and, as the plant burns over six tons of coal per day of ten hours, the economizer more than pays for itself every year.

With a steam pressure of 200 lbs., and a feed water temperature of 60°, the case figures out as follows:

The temperature of evaporation for 200 lbs. gauge pressure is 387.5° F. The latent heat of evaporation is 839 British thermal units. The heat that can be contributed by the economizer is 333.2 British thermal units. The economizer, therefore, can contribute 28.4 per cent. of the total amount of heat required to convert the water from 60° into steam at 200 lbs., or looking at the matter in another way, it can contribute 39.7 per cent. as much heat as does the boiler. This is the theoretical limit, since the economizer is not expected to make steam, in fact, it is provided with a safety valve so that in case it does make steam the latter can escape.

The higher the steam pressure the greater the work of the economizer may be, and, on the other hand, the lower the efficiency of the boiler will be, if it be not supplemented by an economizer. The higher the steam pressure the less is the average difference in temperature between the gases of combustion and the contents of the boiler, therefore the slower the transmission of heat. The temperature of a boiler determines the lower limit to which the gases may be cooled before they pass to the chimney, since no matter how much the boiler surface is extended, the gases cannot be cooled below its temperature. The higher the steam pressure, the higher is this limit and the greater must be the amount of heat lost to the chimney. By the use of the economizer, however, the temperature of the flue gases may be reduced to almost any extent desired, having the temperature of the cold feed water as the lower limit. As usually proportioned, the temperature of the gases leaving the economizer is from 240° to 345° F.

Many installations of fuel economizers are so large that owners of small steam plants are apt to conclude that while the economizers may be a good thing in large plants, it is out of the reach of small ones. This is not true. Economizers pay a bigger dividend in

small steam plants than in large ones, since the small plants are, on the average, subject to more severe overloads than are the larger plants, and are more apt to be overdriven than are the larger plants, perhaps because the business has increased over that for which the boiler plant was originally put in.

Besides preheating water for the boilers, economizers are used to heat water for washing in laundries, hotels and public institutions, for hot water heating, for supplying hot water in dyeing and bleaching establishments, paper mills, tanneries, etc. At the Star Palace Laundry, at Rochester, N. Y., an economizer is used to heat the water for the washing room, raising the water on an average about 100° in temperature with heat that formerly went to waste.

INTENSIFIED ARC LAMP.

The intensified enclosed arc lamp, manufactured by the General Electric Co., Schenectady, N. Y., marks a distinct advance in the field of interior illumination, incorporating as it does all the advantages of the enclosed arc lamp, together with numerous improvements. For years the enclosed arc lamp has been greatly in favor for general mercantile lighting in virtue of the whiteness of its light, low maintenance cost, and high efficiency. It is claimed that by a radical change of design, the intensified arc lamp maintains these special points of superiority even over the other improved artificial illuminants.

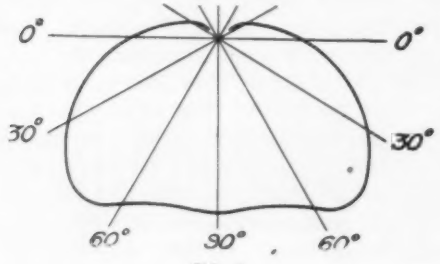


FIG 1.

Particular attention is drawn to the construction of the new lamp. Two upper or positive carbons, 1/4 inch in diameter and 12 inches in length, are placed in converging tubes, so that the ends of the carbons are in contact. A self-acting weight bearing down on the top prevents one carbon from being consumed faster than the other.

One lower or negative carbon is used 3/8 inch in diameter and 4 inches in length. The lower carbon holder is movable in a vertical direction, being attached to a counterweight mechanism through which the action of gravity tends to hold it in contact with the upper carbons. The magnets, acting through a clutch on a rod of the counterweight mechanism, draws the lower carbon downward away from the upper ones. In this way the magnets cause the carbons to strike and maintain the arc, keeping the lower carbon floating at the point of electrical equilibrium.

FIG. 2

When an arc is formed the current density is much greater at the carbon tips than in the case of the standard enclosed lamp; and as the resultant heat cannot be readily dissipated, the carbon tips pass beyond the usual red hot stage to the incandescent, or white hot stage.

In order to obtain the highest efficiency

possible, a small diffuser is used, located directly above the arc. In this way a greater percentage of the light is distributed in the lower hemisphere. The resultant efficiency, therefore, is equal to about 1 1/4 watts per mean hemispherical candlepower at 5 amperes and 110 volts d. c.

The distribution of light, as shown in Fig. 1, is ideal for interior illumination, since maximum intensity is obtained in the working plane where most needed. Perhaps one of the most noticeable features of the lamp is the daylight effect created when in use.

FIG. 3.

The light is of a soft, white tone, and is steadily and evenly distributed. It is stated that the light is so pleasant and restful one is hardly conscious of the illumination.

At five amperes and 110 volts d. c., a carbon life of 75 to 100 hours is obtained. This long life, together with the high efficiency, reduces the maintenance cost to a minimum, so that with the Intensified Arc Lamp it is now possible to obtain the very best grade of illumination in large interiors at a minimum cost. The lamp, as manufactured by the General Electric Co., can be furnished for either d. c. or a. c. multiple circuits.

Figs. 2 and 3 represent the intensified arc lamp equipped with ornamental casings. It will be noticed that this lamp differs materially from convention designs and has very pleasing lines. The outer globe is made of leaded glass to correspond in effect with the casing. The lamp fills a want for an illuminant which is attractive by day, as well as by night, and at the same time which meets the requirements of high grade illumination and minimum cost.

BEAMING DIRECT FROM SPOOLS TO BEAM.

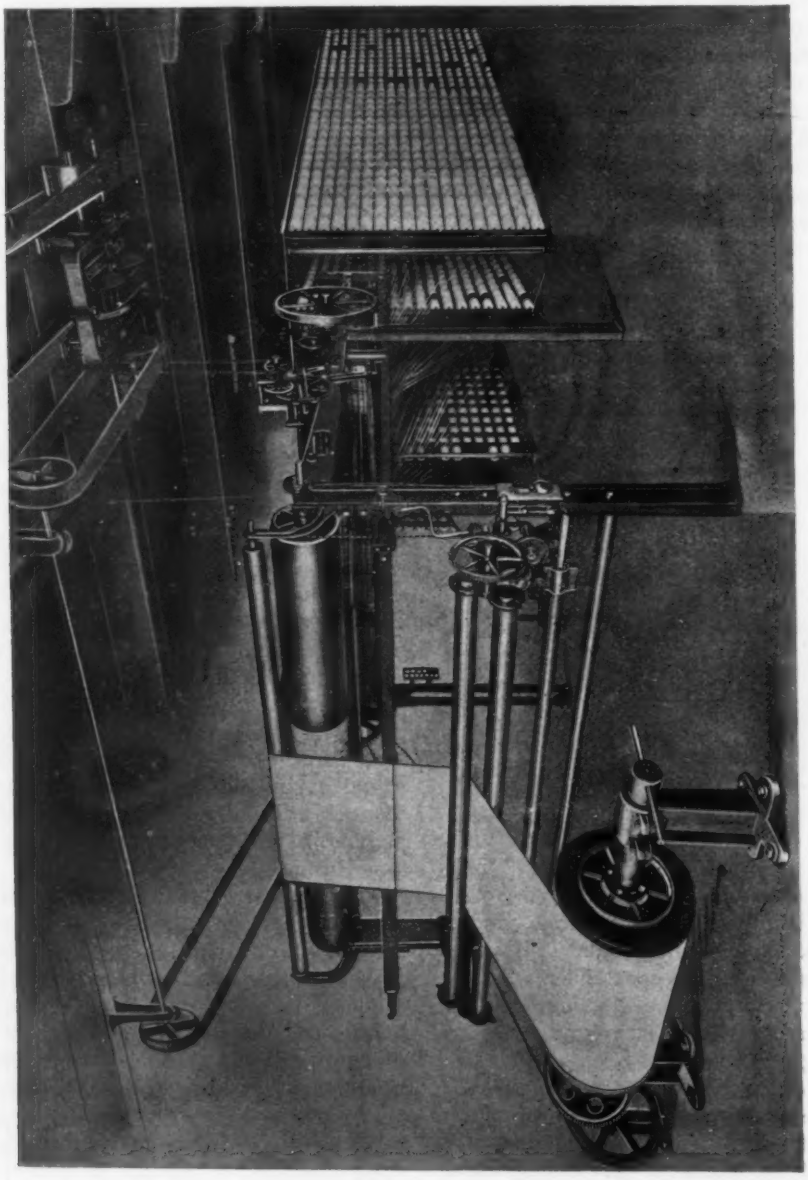
This beamer, built by the Cocker Machinery Co., 4043 Paul St., Frankford, Phila., was designed to meet the demand for a warper that would take the yarn direct from the spool or tube and place it on the loom beam leased and ready to take to the loom for weaving in the one operation. This can, of course, apply only to certain fabrics where it is not necessary to slash or size the warp yarn. For example, with a cotton worsted using a gray warp of two thousand ends, it would be necessary to take the yarn from one or a number of chain or ball warps, and beam to the loom beam.

The production of a beaming frame by this operation is very small, and the cost is high. Another system for making this warp would be by the horizontal mill, running a number of sections to give the required number of ends, and then beaming to the loom beam.

The Cocker Machinery Co. claim that either of these operations is more costly and unsatisfactory than their direct method; costly because of the number of operations required to get the beam in shape for the loom, and unsatisfactory because these methods will not produce a beam that does not have tight and loose ends throughout. With tight and loose ends occurring through a beam, the fabric woven from beams of this description will necessarily be imperfect.

The special beaming warper, it is claimed, eliminates these objections, beaming the warp direct from the spool or tube in one operation, insuring an even tension on every

thread in the beam. The yarn is drawn from the spools or tubes direct by the mechanism which drives the machine. By means of the speed mechanism, the speed of



MACHINE FOR BEAMING DIRECT FROM SPOOLS.

beamer head. It passes over a measuring roller, which operates a cut-marker or measuring machine, and a speed reducing the machine is reduced as the diameter of the beam increases, maintaining a regular number of yards per minute. Tension bars

are used by which the yarn can be beamed to any degree of hardness desired. The leasing mechanism is conveniently located allowing the operator to take the lease quickly. A cut marker enables the cuts to be measured accurately and the machine stopped at the end of any given number of yards. The creel capacity of the machine is between 800 and 3,000 ends, and pattern work can be very readily made, the pattern being laid in the creel.

The illustration shows the machine making a warp with a black and white stripe.

An electrical stop motion, situated in the creel, stops the machine instantly when an end breaks, and an annunciator shows the operator the location of the broken end in the creel, allowing him to piece the end up before it gets to the beam, thus insuring perfect work.

The beamer head is adjustable, allowing various widths of beams to be made on one machine. It is suggested that manufacturers desiring to investigate the merits of this direct beamer, send particulars as to the work they are doing to the builders, who will then give full information regarding the process.

MILL NOTES.

New Jersey, Passaic. It is reported that the Passaic Woolen Mills are running on stock preparatory to closing the plant.

New Jersey, Paterson. The Silk City Warping Co. have taken space in the Ward St. mills, vacated by the Universal Throwing Co., who have moved their plant to the Grimshaw Mill.

*New Jersey, Paterson. The Columbia Ribbon Co., recently reported as purchasing the plant of the Speirs Silk Co., has sold the property to Robert Speirs, who will operate the plant.

*New Jersey, Paterson. Contract has been awarded to the Textile Building Co. for the new mill and power house to be occupied by the Henry Doherty Silk Co. The factory will be 446 by 66 ft., and will cost $139,000.

New Jersey, Paterson. The Washington Silk Co., 93 River St., have moved their plant to the mill vacated by the Fidelity Silk Mill on Haledon Avenue.

New Jersey, Pluckamin. It is reported that a concern known as the Superior Thread & Yarn Co. of New York, has leased the branch mill of the Somerville Mfg. Co., and will install machinery.

New York, Albany. It is reported that the Wyoming Yarn Co. has filed incorporation papers at this place for manfacturing shoddy and waste. Capital stock, $75,000. E. R. Tillinghast, 165 Broadway, New York, is mentioned as interested.

New York, Albany. The Dauntless Silk Co. has been reported incorporated to manufacture, print, dye and finish silks and silk mixed goods. Among those mentioned as the incorporators are Charles D. Kyle, 632 Sixth Ave., Brooklyn, and David R. Friedman, 54 East 116th St., New York.

New York, New York. It is reported that the American Linen Fibre Co. has been incorporated with capital stock of $5,000,000 for manufacturing linen fabrics.

*New York, Utica. It is reported that the project to establish a fine cotton yarn mill here will take the form of a $225,000 corporation to build and equip a plant of $10,000 spindles. They plan to make fine cotton and silk yarns for use in high grade underwear.

North Carolina, Durham. J. K. Mason and associates plan to organize a company to build a cotton cordage, twine and rope mill. Mr. Mason is connected with the Fidelity Bank.

North Carolina, Durham. The Markham-Harris Co. has been reported organized with capital stock of $10,000 for purpose of operating a mill at this place. L. B. Markham and D. Harris are mentioned as interested.

North Carolina, Durham. J. K. Mason (Fidelity Bank) and others are mentioned as interested in organizing a company to operate a plant on cotton rope, twine and cordage.

North Carolina, Graham. J. W. Menefee of Graham, N. C., proposes to organize a company to build a cotton cloth mill, operated by water power on the Haw River. He is now soliciting subscriptions.

*North Carolina, Hickory. M. E. Thornton has issued a prospectus for the cotton mill and hydro-electric power development, mentioned several weeks ago. He plans to have capital stock of $4,000,000 and manufacture a fine grade of cotton fabrics.

North Carolina, Mooresville. A number of business men are planning the organization of a hosiery mill.

Pennsylvania, Lansdowne. A report, which cannot be verified, has it that foreign capital will be interested in the Genasco Silk Co., who operated, until it was sold out recently at auction, the plant of the General Artificial Silk Co. The company, it is said, will start up a new and modern plant for the manufacture of artificial silk and have in view a site in Camden, N. J.

Dyeing, Bleaching, Printing, Etc.

THE ANTHRACENE CHROMATE PROCESS.

BY LOUIS J. MATOS, PH. D.

The anthracene chromate process which has recently been brought to such great perfection for dyeing woolen yarns and piece goods, as well as for raw stock, has been very largely responsible for the production of a wide range of mode shades upon suitings and allied fabrics. It is, without doubt, the ideal one-bath method of dyeing, and although simple in its operation, the results obtained meet in every particular the severest tests usually applied to woolens and worsteds of every description.

From the standpoint of the dyer, perhaps, the most important feature of the process is the certainty of thorough penetration of the goods, while at the same time, uniform and solid shades are obtained. The necessity for thorough penetration is well known for fabrics made of hard twisted worsted yarns. Another very important feature of the process is the condition in which the wool fiber is left after dyeing, and this is due mainly to the fact that the chrome constitutes an ingredient of the dye bath, instead of acting as a mordant requiring fixation previous to dyeing—a process which has a great deal to do with the lofty and free handle that well dyed wool should always possess.

Yarns dyed by the chromate process are not at all likely to be felted, the thread remaining round and the twist intact; this feature alone has been thoroughly recognized, it being found that yarns dyed by this process spool very much better than when dyed by any other, and with the production of a minimum of waste.

Of course in applying any dyeing process, especially when it is the intention of the dyer to obtain good, full, rich shades, uniform in tone, and of thorough penetration, it is necessary that some attention should be paid to the preliminary treatment of the raw stock, yarn, or piece goods before they pass into the dye house. To obtain the best results in all cases, the material to be dyed should be thoroughly cleansed. Unless this is done, it will be impossible to secure the best results, as the dye cannot be properly fixed in the fiber if the natural and artificial impurities remain. Insufficient scouring and rinsing is always the cause of irregular and uneven shades and in nearly every case is also the cause of colors cracking or rubbing off, while the impairment of the luster of the wool is another fault.

The following notes will be found interesting as they represent the best practice in scouring loose wool, yarn, and fabrics, as carried out on a large scale: For each one hundred pounds of wool, 300 gallons (2,500 lbs.) of water will be required, to which is added 10 to 12 pounds of soda ash and 3 pounds of carbonate of ammonia. The scouring proceeds for 1/2 hour, more or less, according to the amount of grease contained in the wool, with the temperature of the liquor at about 100° F. The temperature can be increased, but not to exceed 120° F. From this scour liquor the wool is squeezed and passes into the second tank (also with 300 gals. capacity, 2,500 lbs.), charged with 10 pounds soda ash only, working in this bath for 15 to 20 minutes at 100° to 120° F., squeezing, and finally washing in clean water, taking care that the washing process is sufficiently long to remove all alkali from the fiber. For fine grades of wool, or where the very best finished results are desired, the above scour liquors should not be used after 4 or 5 successive lots of wool have passed.

Yarn scouring is for the purpose of removing the oils and dirt found on the yarn as it leaves the spinning room. While the best method to adopt is hard to determine, one method yielding excellent results on worsted yarns is to scour alternately in two tanks, each of about 150 gallons' capacity, the scour liquor containing for each 140 gallons of water, 6 pints of commercial aqua ammonia.

The yarn is worked in the first tank for 20 minutes, then squeezed, and run through the second tank, worked well, and finally washed in clean water. Each scour liquor should be used but once with the first charging, and for the second lot of yarn, add one quart of fresh ammonia.

Piece goods are best scoured in a bath of sufficient volume to work 100 pounds of cloth, and charged with 5 pounds soda ash and 2 1/2 pounds carbonate of ammonia. The temperature should be about 100° to 110° F., and the cloth worked as an endless chain for about 20 minutes. In some European mills where the best grades of cloth are made, and where ample time is given to all processes, the cloth is allowed to soak in the scour liquor as above prepared, over night, and in the morning the pieces are well rinsed out. It will be noticed that no soap is used in any of these scouring liquors. It has been found that the frequency of the shading of yarns and pieces is due to the presence of soap that has not been completely washed out, and which reacts with the lime or magnesia in the water used in scouring, and causing a deposit of an insoluble soap which effectually prevents the proper taking up of the coloring matter from the dye bath, thus showing shaded areas.

Instead of the combined soda ash and ammonia in the scour liquors, potash may be substituted with the very best results, and it is surprising that the use of this substance is not more general, even for the better qualities of wool. Any cloth manufacturer who takes the time to make a comparison of results of yarns and cloth scoured by the ordinary soap and soda process, and with potash (pearl ash) will see at once the beneficial results from the use of the latter substance.

To obtain the best results for many dyeing processes where metallic salts are used, oils and grease should be completely removed, and where this is done effectively, irregularities will not occur. With clean wool, the dyestuff in the bath is given every opportunity to color evenly each fiber, the result being that every portion of the material is evenly dyed.

The anthracene chromate process is no exception, and the details for its application are as follows: The dyestuff necessary to produce the given shade (as ascertained by previous trials) is dissolved in hot water and added to the dye bath, with 10 to 20 per cent. Glauber's salt, together with a quantity of bichromate of potash equal to half the quantity of color taken. The temperature of the bath is raised to about 100° F. when the goods are entered, after which the bath is raised to the boil during 3/4 hour, and continued at this temperature for 1 1/2 to 2 hours further, or until the proper depth of shade is obtained. For dark shades it is found advantageous to add 1 to 2 per cent. of acetic acid after the goods have been boiling for 1 hour. Shading may be done during boiling, but if additional quantities of color are required, it is best to allow the dye bath to cool off somewhat.

In dyeing piece goods, the same details should be observed regarding the components of the bath, temperature, etc., without any particular care other than good manipulation, even in dyeing fabrics containing resisted threads. Since the introduction of the anthracene chromate process, the manufacture of fancy worsted cloths has been greatly simplified, as the present and past seasons testify. The manufacture of such cloth is dependent upon the proper resisting of the effect threads. For the treatment of wool threads, the bath should contain about 2 1/2 gallons of water for each pound of yarn, and contain from 3 to 3 1/2 ounces of pure tannin. The yarn is entered and gently boiled for about 2 1/2 hours, lifted, and squeezed but not rinsed. It is then worked in a similar bath for 1/2 hour, containing 2 1/2 ounces antimony salt per pound of yarn, and at a temperature of 150° F. Following this antimony treatment, the yarn is passed through a finishing bath containing for each pound of yarn 1/2 ounce of tin crystals and 1/2 ounce of concentrated muriatic acid, the temperature of the bath being 120° F. Lift, wash well, and soap.

Silk yarn for effect threads is worked in identically the same manner as worsted, except that the temperature of the tannin bath is not allowed to exceed 200° F. To color these resisted threads, the dyer has a wide range of dyes to select from. After dyeing, the most important point is to wash the goods thoroughly so as to remove all excess of dye liquor, leaving them in such a condition that the finisher can produce the best results.

Practice has demonstrated that for the general range of a season's shades on suitings, but few colors are required, and the annexed list indicates those which, in the hands of an experienced dyer, will meet all demands on the dye house.

Anthracene Chromate Brown E B.
Anthracene Chromate Brown 3 G.
Anthracene Chromate Black D.
Anthracene Chromate Green F F.
Anthracene Chromate Blue L A.
Anthracene Chromate Red 6 R.

To these may be added other products of the same series, thereby making the palette of the dyer more complete, and for which will be found a number of uses:

Anthracene Chromate Yellows M and G.
Anthracene Chromate Brown L R.
Anthracene Chromate Green B.
Anthracene Chromate Blue L C.
Anthracene Chromate Grey D G.
Anthracene Chromate Black B R.

These products alone or in combination answer the exacting requirements for fastness to washing, milling, crabbing, steaming, and carbonizing.

The question has been asked upon several occasions regarding the adaptability of the anthracene chromate colors for machine dyeing, specially for cops and cheezes. The writer has seen immense quantities of just such yarn dyed in machines built upon the pack and other systems where these colors were in use, and the results were invariably absolute penetration, the surface and interior of the cops being entirely uniform, and the condition of the yarn both chemically and mechanically perfect. Perhaps no single class of colors is better suited for machine dyeing than that above described.

THE DIRECT DYEING AND FELTING OF WOOL.

BY JUSTIN MUELLER.

(From the Dyer and Calico Printer.)

The phenomena of direct-dyeing have been explained in different ways, but the recent physico-chemical theories are only partially explanatory.

In 1904 the author described direct-dyeing as a phenomenon of absorption induced by the more or less colloidal nature of the fiber.

The capacities of different bodies for absorbing coloring matters vary strikingly in the case of comparisons between wool, wood-carbon and blood-carbon. The wood-carbon and the blood-carbon may be said to be colloidally inactive, while the wool is very active, and its activity is somewhat controlled according to the state of acidity or neutrality of the bath.

	Wool Treated.		
Wool not treated.	Without Addition	With 5% H_2SO_4 138° Tw.	With 20% H_2SO_4 168° Tw.
	After treating for one hour over a boiling water-tank, no visible felting of the fiber had taken place, so the treatment was continued for four hours without disturbing the position of the patterns. At the end of this time the patterns were removed, dried and compared with the type.		
	Calcareous Water. (20 deg. French Scale.)		
	Appreciably felted.	Felted, but less than without addition.	Felted slightly more than without addition.
0	10	5	10—11
	Distilled Water.		
	Only very slightly felted.	Slightly felted, but more than without addition.	Freely felted.
0	2	4	8

[The figures indicate the relative degree of felting. 0 being zero and 11 the highest degree of felting.]

Prolonged boiling or the use of too much acid in the course of dyeing is known to provoke the felting of the fiber, and this

change appears to be due to the "gelatinizing" of the fiber and not merely, as some believe, to excessive mechanical manipulation, for otherwise the particular property could be best imparted to the wool when it is in the dry state, whereas for felting there is needed the assistance of liquid and of alkalies, or acids, and heat. To support this view, trials were made with samples of combed wool suitably fastened to glass agitators and arranged so that the fibers should retain their position.

From the results the author concludes (a) that the wool may become felted without the exercise of mechanical action; (b) the felting of the fiber is favored by the addition of acid out the contention that a prolonged treatment at the boil with acids gelatinizes the wool fiber increasingly as the proportion of acid is raised, but this alteration of the fiber to the bath; (c) that by comparative treatment in calcareous water the felting is more pronounced than with the use of distilled water; and (d) that a slight addition of acid to the calcareous water diminishes the phenomenon of felting just as the addition of a greater quantity increases it.

The fact that wool may felt more readily by treating in calcareous water is obviously due to the presence of the alkaline salts, and it is observed in practice that when wool is boiled in neutral baths it becomes more or less altered in character; most industrial waters are calcareous. The results also bear is not necessary for the purposes of dyeing.

As a matter of fact, when dyeing wool in the presence of normal proportions of sulphuric acid (4 to 6 per cent.), for one hour at a temperature close on boiling point, perfect results are obtained and without the least semblance of felting, whereas in boiling in calcareous water felting is induced and the dyeing is less satisfactory. The part played by the acid in the dye bath is consequently of importance, and may be stated in these terms: The felting of wool is induced by acid or alkaline bodies, which affect the fibers in such a manner as to gelatinize their surface.

The most favorable conditions under which wool absorbs coloring matters depends upon the nature of the dyestuff and the other constituents of the bath, and this has been attributed by other authors to the influence of different electrolytes. The function of electrolytes in dyeing operations cannot be disputed, but their effect in the present case is very feeble. The process of direct dyeing rests on the one hand on the coefficient of solubility of the coloring matter in the bath, and on the other on the coefficient of absorption of the fiber at a determined temperature. Level-dyeing is more assured as the coefficient of solution increases; coloring matters, such as Cyanol and Carmine Blue, which are very soluble in the bath, are only partially absorbed on account of the relatively feeble coefficient of absorption of the fiber; the less soluble dyes become absorbed readily. Other coloring matters, such as the Cloth Reds, Lanacyl Blues, certain Acid Violets, and Acid Blacks, have to be applied with precautionary measures to moderate the rapidity of absorption of the fiber and to maintain the equilibrium between the two coefficients. When this equilibrium is exceeded it may be restored in the case of many dyestuffs by prolonging the boiling of the bath by which means the coefficient of solubility becomes more pronounced, a portion of the coloring matter being removed from the fiber and reabsorbed.

With regard to the necessity of acidifying the bath for the application of the majority of the sulphonated dyestuffs, experiments have shown that the acid diminishes the coefficient of solubility, as against the coefficient of absorption of the fiber.

In comparing coloring matters according to their degree of solubility in distilled water, it is found that those which are very soluble require for dyeing the assistance of an energetic acid, such as sulphuric, while for those less and only slightly soluble a feeble acid is required, for in the use of sulphuric acid the rate of absorption is so high as to prevent the possibility of obtaining level-dyeings.

The fact that the direct-dyeing cotton dyes are the less absorbed by wool as the bath is the more alkaline—indeed some do not dye wool at all from an alkaline bath—proves that the coefficient of solubility of these dyes increases with the increasing al-

kalinity of the bath. The author's point of view secures confirmation in the fact that the acid colors directly applied to wool do not bleed in acidulated water, but often in neutral water, and very readily by treating the dyed wood in an alkaline solution.

The circumstances are diametrically opposite in the case of the basic colors, for the coefficient of solubility of these dyes is more pronounced in an acid medium than in an alkaline. The part played by the sulphate of soda added to an acid bath is that of rendering the bath denser and thus raising its boiling point, and also weakening the effect of the acid. In the presence of sulphate of soda, the sulphuric acid is combined under the form of bisulphate of soda, and the acid or its iron not being free acts less energetically.

THE THIES-HERZIG BLEACHING APPARATUS FOR COTTON GOODS.

(From Oesterreich's Wollen und Leinen-Industrie.)

The advantage of caustic alkali as compared with lime in boiling off cotton goods preparatory to bleaching was known in the early days of the art. Many attempts were made to employ caustic alkali, but up to 1887 the experiments were without results. There were two difficulties encountered if a dilute liquor was used, the cloth had a rough and unattractive face. If strong solutions were used the fiber was shrunk and curled while there was a formation of oxycellulose and a deposit of iron on the goods. Heinrich Thies was the first to recognize that concentrated boiling alkali solutions did not mercerize the fiber and that the oxidation and deposit of iron were avoided when the air was completely removed from the goods during the process. These discoveries were the foundation for the Theis-Herzig bleaching process. They were followed by a large number of inventions designed to improve the process.

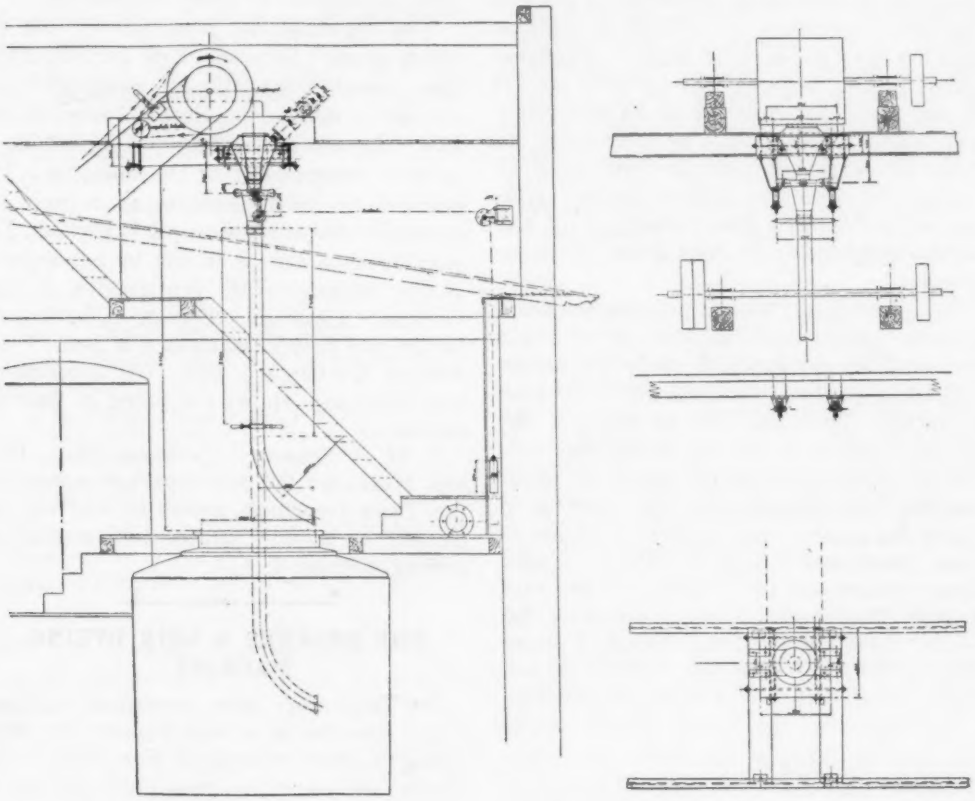
The general advantages of the Thies-Herzig process as compared with other processes are as follows: A saving of time, steam, chemicals and labor, and a production of well bleached and thoroughly cleaned goods in which the strength of the fiber has not been impaired. Since 1887 Herr Theis in Coesfeld and Prof. Walther Mathesius in Charlottenburg have been constantly engaged in studying the process for the purpose of improving it. It has been introduced in the leading bleach works of Germany, Austria, Russia, France and Switzerland. The following are a few of the German firms that have been using it exclusively for ten years or more:

Schlieper & Baum in Elberfeld, Rolffs & Co. in Siegburg, M. van Delden & Co. in Gronau, Christian Dierig in Oberlangenbielau, A. G. Prinz Nachf. in Augsburg, Gesellschaft fuer Spinnerei und Weberei in Ettlingen. These firms have bleaching kiers of 10,000 to 25,000 pounds capacity. The largest kier is used for this system by Louis Geyer in Lodz, Russia, and handles 35,000 pounds of piece goods per day. The various operations of boiling off, bleaching and souring follow in the usual order, but each operation is carried on in a special manner. The souring of the unfinished goods is for the purpose of dissolving the inorganic matter on the fiber, removing the sizing and facilitating the subsequent removal of the foreign matter. For previous bleaching processes acid solution of 1° to 2° Be. were used and the goods were exposed to these strong solutions for long periods. This resulted in a very irregular bleach, some pieces being bleached much more than others, while the strength of the fiber was impaired. For the Thies process acid solutions of 16 grains (30 per cent.) hydrochloric acid per litre is used. This is one-quarter to one-sixth the strength of the first named solutions. A thorough bleach is obtained in a very short time by a suitable raising of the temperature of the liquor, which obviates the necessity of leaving the goods exposed to the acid for any considerable time. The best results in respect to bleaching and cleaning of the goods are obtained by one entry of the cloth into the kier. A much stronger caustic solution is used than by any other process. This is made possible by the complete removal of the air from the goods. The use of strong solutions enables the

process to be carried on with a very small quantity of liquor.

The circulation of the liquor results from the difference in pressure above and below the goods in the kier, the solution being forced through the cloth with greater energy than by any other process. A very uniform distribution of the solution through chloride of lime required is only 2.10 per cent. of the weight of the goods, or two pounds for every 1,000 pounds of cloth. As a result injury to the goods by the formation of oxycellulose is prevented.

The white obtained is permanent, it remaining unchanged after a month of exposure to the sunlight. The goods are car-



the material is obtained, even when a very large quantity, say 30,000 pounds, is treated at one operation. As a result of this special process the liquor acquires a bright yellow shade and the cloth is a clear white. In some cases a percentage of dyestuff, for example indigo, is added to the liquor. The goods are free from all foreign matter and as a result can be bleached with a medium quantity of chloride. The quantity of ried from one machine to the other under light tension and without any quantity being deposited in piles. The cloth piled behind the singeing machine is carried through the acid and scouring operations, then to the bleaching kier, in which it remains over night and is then subjected to a combined washing, scouring and chlorine process, from which it comes ready for the wet calender and drying machine. Special fabrics

can, as a result, be treated over night and are then ready for drying in the morning. The simplicity of the chemical and mechanical process results in a great saving of labor.

Tests for strength have shown that the bleached goods are 20 per cent. stronger than the unbleached fabric. A special effort was made from the very start to adopt the machine for bleaching the entire product of the mill in one kier. As a result the lightest and heaviest goods were treated simultaneously, passing along in two or three strings at the same time in order to fill and empty the large kier on time. As a result of the inventors' efforts the machine was made to deliver the cloth free from twists and without being stretched out of shape. This was accompanied by a reduction of the power required.

In spite of all these improvements there was one feature of the process, up to within two or three years, which made the results dependent on the faithfulness and skill of the operative. This was the packing of the goods in the kier. It was found that with two or three workmen tramping the cloth into the kier irregularities were certain to result, the goods being packed very close in some places and loosely in others. Under these conditions the liquor would pass through the loosely packed portions of the goods, these parts being bleached more thoroughly than were the tightly packed parts of the cloth, which were subjected to a less extent to the action of the liquor. This serious difficulty was finally overcome by Messrs. Theis and Mathesius by the invention of an apparatus which packed the goods uniformly throughout the kier. The operator no longer comes in direct contact with the goods, consequently the cloth can be saturated with acid or alkali liquor raised to any temperature required, which was formerly impossible owing to the impossibility of handling saturated and hot goods.

The apparatus consists of two tubes arranged in telescope form and swinging like a pendulum over the kier. From two to four strings of goods can be passed through the tube at one time. The uniform packing of the cloth in the kier is facilitated by passing the liquor into the upper end of the tube with the cloth. This liquor presses the cloth into the kier. At the same time the liquor is pumped from the bottom of the kier and the result is that the cloth is packed uniformly throughout all parts. This process of filling the kier leaves the cloth free from air, a point of great importance.

The apparatus has been named "the elephant trunk" because of its peculiar form. The operator has only to swing the tube around to deliver the cloth so as to fill the kier. As a result uniformity of packing is assured, independent of the operator. The process can be adjusted so as to vary the pressure with which the cloth is packed. The packing apparatus is in use by Schlieper & Baum, Elberfeld; M. van Delden & Co., Gronau; Christian Dierig, Oberlangenbielau, and Friedr. Mattausch & Sons, Franzenthal, Boehmen & Co. The accompanying illustration shows the filling or packing apparatus.

L. H. A. Schwartz, Exchange Bldg., Boston, Mass., are the sole American agents for the Thies bleaching apparatus and will be pleased to supply further information to anyone interested.

THE ERCKENS & BRIX DYEING MACHINE.

Our September issue contained an illustrated description of the Erckens & Brix dyeing machine translated from l'Industrie Textile, and which has attracted much attention. L. H. A. Schwartz & Co., Exchange Bldg., Boston, Mass., are sole American agents for this dyeing machine. The type which is most popular in this country is that adapted for cross wound spools, 6 inches long and 5 inches in diameter. The machine is in successful operation in a large number of leading American mills, many of which have given repeat orders. Messrs. L. H. A. Schwartz & Co. will be pleased to give anyone interested full information regarding this machine.

DYE RECIPES.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 145.

Blue on Cotton Yarn.

Cross Dye Blue D Conc. on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Cross Dye Blue D Conc.
(Read Holliday & Sons, 11 Gold St., New York.)
12 lbs. Sulphide of Soda.
4 lbs. Soda Ash.
50 lbs. Salt.

Boil for 3/4 of an hour, after which lift out, wash and dry. These colors are very fast to light and washing.

Recipe No. 146.

Violet on Cotton Yarn.

Diamine Fast Violet F F R on 100 lbs. cotton yarn. Prepare the dye bath with

1 lb. Diamine Fast Violet F F R.
(Cassella Color Co., 182 Front St., New York.)
10 lbs. Common Salt.
1 lb. Soda Ash.

Enter at 180° F., and dye at a boil for one hour.

Diamine Fast Violet F F R is characterized by very good fastness to light.

Recipe No. 147.

Blue on Worsted Yarn.

Wool Fast Blue B L on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Wool Fast Blue B L.
(Badische Co., 128 Duane St., New York.)
15 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.

Enter at 140° F., and dye at a boil for one hour.

Wool Fast Blue B L gives a shade of very bright blue which possesses good fastness.

Recipe No. 148.

Scarlet on Cotton Yarn.

Algole Scarlet G Paste on 100 lbs. cotton yarn. Prepare the dye bath as follows:

To
25 lbs. Algole Scarlet G Paste
(Farbenfabriken of Elberfeld Co., 66 Lafayette St., New York.)
Add
3 ozs. Caustic Soda Solution, 53° Tw., and
5 gals. Lukewarm Water.

Stir well and add sufficient cold water to bring the bath up to a volume equivalent to 250 gallons. (Volume of dye liquor equal to 20 times the weight of goods.)

Before adding the color solution to the bath it is advisable to previously add to the bath

1 oz. Caustic Soda Solution, 53° Tw., and
3 ozs. Hydrosulphite Solution, 27° Tw., per 10 gallons of liquor.

Then add

8 gals. Hydrosulphite Solution, 27° Tw., and
250 lbs. Common Salt.

Stir well and allow to stand for some minutes. Enter the material and dye at ordinary temperature for one hour. Squeeze well, and allow to air for 1/4 of an hour. Then acidulate in a bath containing 1/4 ozs. sulphuric acid per gallon. Finally wash again and soap at 120° to 140° F.

Algole Scarlet G Paste will be found to give dyeings possessing excellent fastness to light and chlorine, and good fastness to washing, acid and alkali.

The Preparation of Hydrosulphite 27° Tw.

To prepare hydrosulphite 27° Tw., add slowly 13 lbs. zinc powder to 10 gallons bisulphite of soda 72° to 78° Tw. While adding the zinc powder to the bisulphite, the temperature of the solution should not rise above 100° F., and it is therefore advisable to cool down with ice. After adding the zinc powder, stir well for 1/2 hour, then allow to stand for one hour and filter the solution through a piece of calico. To this solution add milk of lime, which is prepared by slacking 1 lb. of quick lime in 3 1/2 pints of water, and then stirring well. After allowing to stand for two hours, filter the solution, and then add 1/4 gill soda lye 76° Tw. per gallon of liquor. The hydrosulphite solution thus obtained is then made up with water to 27° Tw.

Recipe No. 149.

Red on Worsted Yarn.

Azo Fuchsine 6 B X on 100 lbs. worsted yarn. Prepare the dye bath with

1¼ lbs. Azo Fuchsine 6 B X.
(Badische Co., 128 Duane St., New York.)
15 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.

Enter at 140° F., and dye at a boil for one hour.

Azo Fuchsine 6 B X gives a very desirable shade of bluish red which possesses good fastness.

Recipe No. 150.

Blue on Cotton Yarn.

Thiogene New Blue B L on 100 lbs. cotton yarn. Prepare the dye bath with

5 lbs. Thiogene New Blue B L.
(H. A. Metz, 122 Hudson St., New York.)
5 lbs. Sodium Sulphide.
5 lbs. Soda Ash.
40 lbs. Common Salt.

Dye at a temperature just below the boil for one hour.

Thiogene New Blue B L is a readily soluble sulphur color which stands light, milling and washing better than the ordinary direct cotton blues.

Recipe No. 151.

Khaki on Cotton Yarn.

Thiogene Khaki N Conc. on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Thiogene Khaki N Conc.
(H. A. Metz, 122 Hudson St., New York.)
9 lbs. Sodium Sulphide.
5 lbs. Soda Ash.
15 lbs. Common Salt.

Dye at a temperature just below the boil for one hour.

Thiogene Khaki N Conc. is a straight color which possesses very good fastness, which may be somewhat increased by an after treatment with potassium bichromate and copper sulphate.

Recipe No. 152.

Red on Cotton Yarn.

Algole Bordeaux 3 B Paste on 100 lbs. cotton yarn. Prepare the dye bath as follows:

To
25 lbs. Algole Bordeaux 3 B Paste
(Farbenfabriken of Elberfeld Co., 66 Lafayette St., New York.)
Add
3 ozs. Caustic Soda Solution 53° Tw., and
5 gals. Lukewarm Water.

Stir well, and add sufficient cold water to bring the bath up to a volume equivalent to 250 gallons. (Volume of dye liquor equal to 20 times the weight of goods.)

Before adding the color solution to the bath it is advisable to previously add to the bath

1 oz. Caustic Soda Solution 53° Tw., and
3 ozs. Hydrosulphite Solution 27° Tw., per 10 gallons of liquor.

Then add

8 gals. Hydrosulphite Solution 27° Tw., and
250 lbs. Common Salt.

Stir well and allow to stand for some minutes. Enter the material and dye at ordinary temperature for one hour. Squeeze well and allow to air for 1/4 hour. Then acidulate in a bath containing 1/4 oz. sulphuric acid per gallon. Finally wash again and soap at a boil.

Algole Bordeaux 3 B Paste will be found to give dyeings possessing excellent fastness to light and chlorine, and good fastness to washing, acid and alkali.

The Preparation of Hydrosulphite 27° Tw.

To prepare hydrosulphite 27° Tw., add slowly 13 lbs. zinc powder to 10 gallons bisulphite of soda 72° to 78° Tw. While adding the zinc powder to the bisulphite, the temperature of the solution should not rise above 100° F., and it is therefore advisable to cool down with ice. After adding the zinc powder, stir well for 1/2 hour, then allow to stand for one hour and filter the solution through a piece of calico. To this solution add milk of lime, which is prepared by slacking 1 lb. of quick lime in 3 1/2 pints of water, and then stirring well. After allowing to stand for two hours, filter this solution, and then add 1/4 gill soda lye 76° Tw. per gallon of liquor. The hydrosulphite solution thus obtained is then made up with water to 27° Tw.

Recipe No. 153.

Blue on Cotton Yarn.

Pyrol Blue R Conc. on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Pyrol Blue R Conc.
(C. Bischoff & Co., 451 Washington St., New York.)
20 lbs. Sodium Sulphide.
5 lbs. Soda Ash.
60 lbs. Common Salt.

First boil up the bath with the soda ash, then add the dyestuff which has been previously dissolved in boiling water containing the sodium sulphide. The bath is then boiled for a short time, and the Glauber's Salt added. The material is entered and the dyeing continued for one hour at a temperature of about 200° F.

Pyrol Blue R Conc. possesses good fastness to all of the common color destroying agencies.

Recipe No. 154.

Yellow on Cotton Yarn.

Sulphur Yellow 4 G on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Sulphur Yellow 4 G.
(Berlin Aniline Works, 213 Water St., New York.)
20 lbs. Sodium Sulphide.
5 lbs. Soda Ash.
60 lbs. Common Salt.

Dye at a temperature just below the boil for one hour. The above dyeing may be duplicated in a standing bath with the use of 6 1/2 lbs. of color.

Sulphur Yellow 4 G possesses good fastness to most of the color destroying agencies, and is characterized by its clearness of shade.

Recipe No. 155.

Blue on Cotton Yarn.

Pyrol Blue R R Conc. on 100 lbs. cotton yarn. Prepare the dye bath with

10 lbs. Pyrol Blue R R Conc.
(C. Bischoff & Co., 451 Washington St., New York.)
20 lbs. Sodium Sulphide.
5 lbs. Soda Ash.
60 lbs. Common Salt.

First boil up the bath with the Soda Ash, then add the dyestuff which has been previously dissolved in boiling water containing the sodium sulphide. The bath is then boiled for a short time and the Glauber's Salt added. The material is entered and the dyeing continued for one hour at a temperature of about 200° F.

Pyrol Blue R R Conc. possesses good fastness to all of the common color destroying agencies.

Recipe No. 156.

Green on Cotton Yarn.

Cross Dye Green B on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Cross Dye Green B.
(Read Holliday & Sons, 11 Gold St., New York.)
12 lbs. Sulphide of Soda.
4 lbs. Soda Ash.
50 lbs. Salt.

Boil for 3/4 of an hour, after which lift and wash and dry. These colors are very fast to light and washing.

Recipe No. 157.

Red on Worsted Yarn.

Brilliant Acid Carmine 6 B on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Brilliant Acid Carmine 6 B.
(Geisenheimer & Co., 189 Front St., New York.)
4 lbs. Sulphuric Acid.
15 lbs. Glauber's Salt.

Enter at 120° F., and dye at a boil for one hour. Brilliant Acid Carmine B possesses good fastness to light, acids, soaping and alkali. It is a very level dyeing color and does not stain white cotton threads. It should not be used in copper apparatus.

Recipe No. 158.

Brown on Cotton Yarn.

Paranil Brown G on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Paranil Brown G.
(Berlin Aniline Works, 213 Water St., New York.)
40 lbs. Glauber's Salt, Crystals.
2 lbs. Soda Ash.

Enter at 180° F., and dye at a temperature of 200° F. for one hour. Rinse and then develop in a bath made up as follows:

Dissolve 1 lb., 6 oz. Paranitraniline together with 3 1/4 lbs. 32° Tw., Muriatic Acid, and 1 quart of boiling water. When dissolved this should be made up to 3 gallons with water.

3/4 lb. Sodium Nitrite is then dissolved in 1 quart of water, and this solution together with the acid paranitraniline solution are made up to the necessary quantity for developing.

3 lbs. Sodium Acetate are then added to the bath, and the dyed yarn worked at ordinary temperature for 1/2 hour, then rinsed and dried.

Paranil Brown G possesses good fastness to washing and most of the common color destroying agencies.

Recipe No. 159.

Violet on Cotton Yarn.

Diamine Fast Violet F F B on 100 lbs. cotton yarn. Prepare the dye bath with

1 lb. Diamine Fast Violet F F B.
(Cassella Color Co., 182 Front St., New York.)
10 lbs. Common Salt.
1 lb. Soda Ash.

Enter at 180° F., and dye at a boil for one hour.

Diamine Fast Violet F F B is characterized by very good fastness to light.

Recipe No. 160.

Bordeaux on Cotton Yarn.

Paranil Bordeaux B on 100 lbs. cotton yarn. Prepare the dye bath with

4 lbs. Paranil Bordeaux B.
(Berlin Aniline Works, 213 Water St., New York.)
40 lbs. Glauber's Salt Crystals.
2 lbs. Soda Ash.

Enter at 180° F., and dye at a temperature of 200° F. for one hour. Rinse and then develop in a bath made up as follows:

Dissolve 1 lb., 6 ozs. Paranitraniline together with 3 1/4 lbs. 32° Tw. Muriatic Acid, and 1 quart of boiling water. When dissolved this should be made up to 3 gallons with water.

3/4 lb. Sodium Nitrite is then dissolved in 1 quart of water, and this solution together with the acid paranitraniline solution are made up to the necessary quantity for developing.

3 lbs. Sodium Acetate are then added to the bath, and the dyed yarn worked at ordinary temperature for 1/2 hour, then rinsed and dried.

Paranil Bordeaux B possesses good fastness to washing and most of the common color destroying agencies.

Mill News.

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires facts and gossip of the trade are referred to the Textile Advance News, issued weekly by the publishers of the Textile World Record, at $15.00 per year.

COTTON.

New Mills.

*Georgia, Albany. John H. Lowe of Columbus, Ga., has secured contract for the erection of buildings for the Albany Cotton Mills. R. J. Edgerty of Albany will build the reservoir. As reported, the company intends to install 10,800 spindles and 280 looms for manufacturing broad sheeting and print cloth. The capital stock is $250,000.

*Massachusetts, Charlton City. Operations will be started about November by the Worcester Wadding Mfg. Co., Inc., making cotton wadding. A. Solod is president of the company and Nathan Pemstein, treasurer and buyer. Plant is equipped with a dye house and has steam and water power.

*Massachusetts, New Bedford. It has been definitely reported that the new mill to be built by James E. Stanton and others will be a cloth mill. Work on buildings will probably not be started before 1910. The mill will be a small one as New Bedford mills go.

North Carolina, Hickory. A. A. Shuford Mill Co. has organized with G. H. Geitner, president; G. F. Ivey, vice-president; A. A. Shuford, Jr., secretary, and A. A. Shuford, Sr., treasurer. As noted several weeks ago this company is capitalized at $80,000, and will build a plant to be equipped with 3,000 spindles for manufacturing coarse yarns.

*North Carolina, Roanoke Rapids. Contract has been awarded for buildings for the Patterson Mills Co., and construction work will be started at once. As noted previously, equipment will be 20,000 spindles and 750 looms for manufacturing ginghams. Almost all of the machinery has been purchased, but they are still interested in power transmission machinery, three 100 h. p. boilers, and general supplies. S. F. Patterson is general manager and buyer. The mill will be operated by electric power.

*North Carolina, Rockingham. Stuart W. Cramer has been engaged as engineer-architect in charge of planning, building, and equipping the proposed mill of the Entwistle Mfg. Co. This plant will have 40,000 spindles and 1,000 looms. As noted previously the capital stock is $500,000. William Entwistle is president, George P. Entwistle, secretary and treasurer, and W. B. Cole, vice-president and general manager.

*North Carolina, Smithfield. The Ivanhoe Mfg. Co. wants two 78-inch horizontal tubular steam boilers, working capacity 135 pounds, and also bids on a brick or concrete chimney, 5 ft. in diameter and about 110 ft. high.

North Carolina, Thomasville. J. W. Cannon of Concord will erect a cotton mill here, and J. W. Hill, of Winston Salem, a son-in-law of Mr. Cannon, will probably be actively in charge. This project is for a $150,000 to $200,000 mill.

*North Carolina, Thomasville. Construction work will begin next week on buildings for the Jewel Cotton Mills. The initial equipment will be 6,048 spindles, but the buildings will be erected with a view to increasing this capacity. Few contracts have been awarded and they will contract shortly for practically all supplies and some of the machinery equipment. T. J. Lillard is treasurer and buyer.

*North Carolina, Vass. No machinery has been bought by the Vass Cotton Mill Co. In fact beyond a general intention to manufacture yarn, it has not been decided just what their product will be. The mill building, water power development, cotton houses, and some cottages were built by Angus Cameron, one of the incorporators and probably the largest stockholder. Officers have not been elected. The authorized capital stock is $250,000.

*Oklahoma, Lawton. In about 30 days the Lawton Textile Mfg. Co. expects to begin construction of buildings. If present plans are followed out the plant will be completed and equipment installed by May 1910. 10,920 mule spindles, 32,928 ring spindles, and 1,050 looms will be installed for manufacturing blankets, quilts, sheetings, denims, sateens, laces, and lace curtains. The Lawton spinning Co., which will be affiliated with the Lawton Textile Mfg. Co., will be a yarn mill manufacturing about 20s cotton yarns.

*Rhode Island, Manville. Arrangements are being made by the Independent Cotton Mfg. Co. to erect a new cotton mill projected for some time.

*Rhode Island, Westerly. Work is nearing completion on the new plant for the Westerly Narrow Fabric Co.

South Carolina, Easley. E. H. Shanklin, superintendent of the Easley Cotton Mills, is soliciting subscriptions to build a new cotton mill, and he hopes to erect a $250,000 plant, to be equipped with 10,000 spindles and 250 looms. It is understood that half of this amount has been secured.

*Tennessee, Memphis. The Central Textile Corporation, about which detailed report has been previously given, will have an equipment of 25,000 ring spindles and 800 looms. All machinery has been contracted for. W. H. Carter is president of the concern and O. H. P. Piper, vice-president. Will sell direct.

Enlargements and Improvements.

Georgia, Atlanta. Contract has been awarded by the Fulton Bag & Cotton Mills for the erection of two additional buildings, one 60 by 150 ft., for picker building and the other a warehouse.

Canada, Ontario, Cornwall. Eighty new Stafford looms have recently been installed in the Stormont Mill of the Canadian Colored Cotton Co. and 56 more are to be added in the near future. In the Canada mill of this company improvements have been made in the spinning department.

Connecticut, Ballouville. Eighty new Northrop looms have arrived, and will be installed at once in the Ballou Mills. About 25 additional looms are to be received.

Connecticut, Killingly. Within a few days 40 new Northrop looms will be added to the equipment of the Attawaugan Mill.

*Georgia, Columbus. Construction work is about completed on the two-story addition to the Perkins Hosiery Mills and it is expected that machinery will be installed and in operation about September 15. As reported previously, 8,000 spindles and accompanying equipment will be installed for manufacturing white and colored yarn for the knitting trade.

Georgia, Columbus. The Muscogee Manufacturing Co., which has installed electric power in nearly all the mills, will equip the No. 1 mill with same power.

*Georgia, Columbus. 4,160 new spindles will be installed by the Georgia Mfg. Co. about Dec. 1, giving a total of 8,320 spindles. At present they operate an overall manufacturing department, which will be sold, and the new spindles installed in the space thus provided. 5s to 12s white and mixed hosiery yarns, and 84-needle hosiery are manufactured, the plant being operated by electric power. E. P. Dismukes is president, O. M. Holland treasurer, and C. E. Doughtie superintendent and buyer.

Georgia, Macon. Contract has been awarded to the Lowell Machine Shop, Lowell, Mass., by the Bibb Mfg. Co., for $92,000 worth of new machinery to be installed in the company's mills at Columbus, Macon and Porterdale.

*Georgia, West Point. Additions are being made to the mills of the Lang Mfg. Co. to provide space for the equipment of the Hoffman-Corr Mfg. Co., which is being removed to West Point from Philadelphia.

*Maine, Biddeford. The Pepperell Mfg. Co. is tearing down its boarding houses, and will use the brick in the construction of the new weave shed being built on Smith St.

*Maryland, Ilchester. Manufacturing will be started about January 1 in the old plant of the Thistle Mills Co. which has been taken over by a new company known as the Thistle Mills, Inc., as noted previously. The new corporation has capital stock of $150.000, and has organized with Albert A. Blakeney, president and buyer; Redmond C. Stewart, treasurer, and E. H. Blakeney, superintendent. They propose to dispose of the silk machinery and manufacture cotton duck and perhaps some print cloths. They will have 10,000 spindles and from 150 to 200 looms. The product will be sold by Baldwin & Leslie of New York.

Massachusetts, Adams. Eighty new Northrop looms have been installed by the Renfrew Mfg. Company.

Massachusetts, Fall River. At a meeting of the directors of the Lincoln Mfg. Co., it was decided to place before the stockholders a proposition to increase the capital stock from $600,000 to $700,000 and to increase the spindles from 50,000 to 60,000, approximately. The present plant has 50,000 spindles installed, with capacity for about 60,000 spindles. The power plant is sufficient to take care of the increase. With these additional 10,000 spindles installed, the cost of the plant will figure about $17.50 per spindle. The mill is on a money-making basis and with this change completed expects to be in position by the middle of next year to enter the list of dividend payers. There seems to be no doubt that the stockholders will act favorably on the proposition.

*Massachusetts, Fall River. Contracts for machinery for the Flint Mills have been awarded.

Massachusetts, Fall River. Eight new boilers of 150 h. p. capacity are being installed in No. 2 Mill of the Granite Mills. No other changes are contemplated for the present.

*Massachusetts, Fisherville. Work has been started on the brick work of the four-story addition for the Fisher Mfg. Co.

*Massachusetts, Fitchburg. Floors have been laid in the second and third stories of the new mill for the Parkhill Mfg. Co. New looms will be installed.

*Massachusetts, Lowell. Contract has been let for the generator for the Massachusetts Mills. Foundations have been completed for a new one-story building, 328 by 48 ft. and also for a new two-story addition, 340 by 92 ft., to the dye house.

*Massachusetts, Lowell. The new spinning mill for the Lawrence Manufacturing Co. is nearly completed. All the mule spinning of the company's plant will be installed in the one building, 285 by 100 ft., five stories. Operations have been resumed by the company on full time, having been run on a five day schedule lately.

*Massachusetts, Three Rivers. Good progress is being made on the new weave shed under construction for the Palmer Mill of the Otis Co.

New Hampshire, Claremont. The Monadnock Cotton Mills have started work on the erection of a new brick weave shed, 100 by 70 ft., two stories. They have recently completed an addition to the bleachery.

*New Hampshire, Manchester. Carpenters are engaged in finishing the interior of the Coolidge Mill, the large new mill of the Amoskeag Mfg. Co. About 20 carloads of spinning machinery have arrived and are to be set up as soon as the carpenters finish their work. Large additions are being made to the power plant.

New York, Lestershire. It is understood that the Corliss Towel Mills who have been manufacturing towels on 4 looms will shortly increase.

*New Hampshire, Nashua. Work has begun on excavating for the foundations of the new mills of the Wonalancet Co.

*New York, New York Mills. The new addition to the Walcott & Campbell spinning plant has been completed. They have installed 10 new spinning frames, 26 carding machines, three twisters and three winders.

*North Carolina, Albermarle. Excavations have been completed, and work will now be started on the erection of additions to the Efird Mfg. Co. and the Wiscassett Mills Co. Enlargement to the Efird Mfg. Co. will include a 2-story building, 300 by 50 ft., to be equipped with 15,000 spindles. A 100 by 300-foot building will be built for the Wiscassett Mills Co., to be equipped with 25,000 spindles. John W. Cannon of Concord, North Carolina, is president of both concerns.

*North Carolina, Bessemer City. Organization of the Mascot Cotton Mill Co. has been completed. C. W. Fuller is president; C. B. Armstrong, treasurer; and C. E. Whitney, secretary and buyer. As noted the new corporation takes over the Bessemer City Cotton Mills, and it is reported will build a water tower and make improvements to the dye house.

North Carolina, Burlington. A brick addition, 60 by 100 ft., one story, is being built to the dye house of the Aurora Cotton Mills. Additional dyeing and bleaching machinery will be installed.

North Carolina, Cedar Falls. Ninety-six new looms will be installed in the plant of the Cedar Falls Mfg. Co. next week.

*North Carolina, Charlotte. The Chadwick-Hoskins Co. is proceeding with the addition to the Calvine Mill. An addition 2 stories high, 50 by 200 ft., is being built. Seven thousand new spindles are to be installed.

*North Carolina, Charlotte. Contracts for additional building and machinery have been awarded by the Mecklenburg Mfg. Co. The new equipment will include 2,000 spindles and 50 looms. The new building will be erected for an office and cloth room.

North Carolina, Cliffside. Extensive additions will be made by the Cliffside Mills, and approximately 10,000 spindles and 220 looms installed. This is in addition to the 70 looms added last June.

*North Carolina, Concord. The machinery is being installed in the new bleachery recently completed for the Odell Manufacturing Co.

*North Carolina, Henderson. Construction work has been started on No. 2 Mill of the Henderson Cotton Mills. It is intended to equip this mill with 10,000 spindles and accompanying machinery.

*North Carolina, Lakewood. The Green River Manufacturing Co. has completed addition to the plant. They now have an equipment of 7,300 spindles, making combed, single and 2 ply yarns, 60s to 100s.

*North Carolina, Lenoir. The Moore Cotton Mill Co., recently reported as increasing the capital stock, will install 2,176 new spindles in the plant.

*North Carolina, Lumberton. The National Cotton Mills have completed the installation of new equipment.

North Carolina, Statesville. Thirty new Northrop looms are being installed by the Statesville Cotton Mills, replacing the same number of old looms.

Pennsylvania, Conshohocken. Plans have been completed by the J. Ellwood Lee Co. for two manufacturing buildings, one four stories in height, 85 by 140 ft., and the other two stories high, 82 by 90 ft. Additions will also be made to the power plant.

Pennsylvania, Philadelphia. Plans have been finished and estimates are being invited for improvements to the buildings of the Bernstein Manufacturing Co., manufacturers of felt mattresses and bedspreads at 3d and Westmoreland Sts. The plans call for an additional story on the main building 50 by 300 ft., an additional story to the foundry building and a new two-story building for other purposes. The estimated cost is about $35,000.

*Pennsylvania, Philadelphia. The Industrial Mills, Huntington and Jasper Sts., reported to install 10 new looms, will increase their capacity to 60 looms.

Rhode Island, Central Falls. The Naushon Co., who several months ago sold their plant at Valley Falls, to the Tilton Mills, and later reorganized with capital stock of $350,000, have secured the old Ross mill on Hadwin street of this place, and when the necessary alterations are completed, will install machinery for manufacturing cambrics. They will start on a small scale as the mill is only 42 by 75 ft., 4 stories high. The New York office of the company is at 66 Leonard street.

*Rhode Island, Lonsdale. The Lonsdale Co. is installing 200 new looms in the No. 4 mill of the Ann & Hope plant.

Rhode Island, Pawtucket. Construction work has been started on a brick addition, 1 story high, 150 by 56 ft., for D. Goff & Sons. The new space will be used for finishing only.

Rhode Island, Providence. Contract for the new 3-story weave shed for the Coventry Co. has been awarded, and work started.

*South Carolina, Anderson. The Cox Manufacturing Co., reported to install looms for weaving cloth, will add 500 (ordered).

South Carolina, Anderson. The Toxaway Mills are adding five new spinning frames to their present equipment.

South Carolina, Anderson. New machinery has been ordered by the Conneross Yarn Mill, including 400 more spindles, new spoolers, twisters, etc. They manufacture cotton rope and yarn.

*South Carolina, Calhoun Falls. Arrangements have been completed for increasing the capital stock of the Calhoun Mills from $400,000 to $600,000. Their large new mill will be ready for operation in January and will be equipped with 10,000 spindles and 200 looms. Contract for construction work has been awarded to John F. Grandy & Son of Greenville, S. C.

*South Carolina, Central. Good progress is being made on the addition under construction for the Issaqueena Mill, which is 175 ft. long, and will cost $25,000. 12,000 spindles and 300 wide looms are to be installed. The capital stock was increased from $200,000 to $300,000 to finance the enlargement.

*South Carolina, Fairmont. Changes which are being made in the plant of the Fairmont Mfg. Co. will be completed and manufacturing started about October 1. At present pickers and cards from the dismantled Huguenot Mills at Greenville are being installed. The capital stock is $300,000 and print cloths will be manufactured on 12,400 spindles and 300 looms. The product will be sold through Fleitman & Co. The mills are operated entirely by water power. H. B. Jennings is president and buyer, J. B. Lee, treasurer, and W. E. Redd, superintendent.

*South Carolina, Greenwood. Stockholders of the Grendel Mills approved the plan to increase the company's capital stock and build another mill. The increase will be from $350,000 to $500,000 and the new mill will have 10,000 spindles and 250 looms. J. E. Sirrine of Greenville, S. C., is the architect and engineer in charge.

South Carolina, Greenville. The Monaghan Mills are installing electric drive, electricity being furnished by the Greenville transmission lines of the Southern Power Co. About $30,000 is the cost of the electrical installation.

*South Carolina, Rock Hill. The Wymojo Yarn Mills, reported to increase the capital stock, will add 4,000 new spindles to the plant. This mill is run on 8/3 and 24/2 yarns.

South Carolina, Westminster. At a meeting of the board of directors of the Cheswell Cotton Mill Co. it was decided to increase the capital stock from $200,000 to $500,000, and build a new mill. The name of the company will be changed to Oconee Mill. The matter will be laid before the stockholders at a meeting to be held September 23.

Mills Starting Up.

North Carolina, Rockwell. The Barringer Mfg. Co. will begin the manufacture of cotton yarns in a few days with 3,000 spindles in operation. It is planned to start 2,000 more spindles, which will be installed at an early date. Otho Barringer is manager.

North Carolina, Wilson. The Wilson Cotton Mills, which have been shut down for several months, will resume manufacturing as soon as the new crop of cotton is marketed.

Mills Shutting Down.

Pennsylvania, Philadelphia. The Taylor & Scott Co. is no longer in existence, the machinery consisting of 16 looms which were operated on damasks, having been disposed of in settling up the estate of Mr. Taylor, who recently died.

Rhode Island, Central Falls. Operations have been suspended for the present in the Star Hair Cloth Co.'s plant.

WOOLEN.

New Mills.

*Connecticut, Rockville. Thomas J. Corcoran, Jr., a son of the superintendent of the Sayles & Jenks Mfg. Co., Warren, Mass., will be in charge of the worsted weaving plant to be located in the Fitch Mill. His father, Thomas J. Corcoran, Sr., and Edmond Corcoran, superintendent of the Shackamaxon Worsted Co., Philadelphia, will own the plant. Worsted yarns will be bought.

*Minnesota, Minneapolis. The Keystone Worsted Mills, recently reported from Philadelphia as securing a charter, will probably be located here. It is stated that they propose to erect a mill, and will equip it with machinery for spinning yarns on the Bradford system, and also manufacturing worsted fabrics. The officers are John Willingmyre, president; J. F. Wilson of the Minneapolis Board of Trade, vice-president; Fred Wink, secretary, and D. W. Willingmyre, treasurer. All these men with the exception of Mr. Wilson live in Philadelphia. The offices of this company will be at 113 Chestnut St., Philadelphia. Their capital stock is $300,000.

*Pennsylvania, Conshohocken. About September 20 Crowther & Dahlstrom will start up the old McFarland Mills as noted. They will operate under the style of the Montgomery Worsted Mills, and will make men's wear and ladies' dress goods in cotton, woolen and worsted. They have 7 sets of wool cards and 70 looms. B. B. Crowther is superintendent and buyer. The goods will be dyed and finished at the mill and sold direct.

*Pennsylvania, Philadelphia. The Gothic Wilton Rug & Carpet Co. will have capital stock of $3,500 and will organize with Wm. Scholes, president; Stover Srook, treasurer; Dove McKelvey, agent and Wm. Chalk, superintendent. They will manufacture Wilton rugs and carpets, giving employment to about 25 hands, and will sell the product direct.

Pennsylvania, Philadelphia. George A. Marshall has started up a plant for commission wool combing at 2212 Noble St., where he has taken over the equipment of 6 cards and 6 combs formerly operated by the Caledonia Mills.

Rhode Island, Providence. The United States Dress Goods Co., Inc., has been granted a charter with capital stock of $250,000 to manufacture and deal in yarn, cloth, and other textile fabrics of cotton, wool and silk. The incorporators are Fred B. Manley, Allison Stone, and Robert Young. It is reported that this company has purchased a tract of land in the rear of the Atlantic Mills in Olneyville on which a mill is to be erected. It is reported further that 4,000 spindles are to be installed at first, to make worsted yarns, and that later a weaving department will be equipped. Mr. Hanley was recently agent of the Atlantic Mills, and will be agent for the new company. Mr. Stone will be selling agent. Robert Young was at one time connected with the Hodgson Worsted Co.

Enlargements and Improvements.

Connecticut, Rockville. A new turbine wheel will be installed in the New England Co.'s plant replacing the old wheel which has been in use since 1860. When the new wheel is installed the mill will be run by electric drive, the water power being used to run a generator.

*Illinois, Lacon. The new dye house for the Lacon Woolen Mills will be 66 by 26 ft. They will put in 6 new tubs.

Iowa, Davenport. Eight broad looms are being added to the present equipment of the Davenport Woolen Mills Co. In April it was reported an increase would be made.

*Kentucky, Louisville. As noted previously the Bradford Worsted Spinning Co. has awarded contracts for new machinery and for the erection of a new building. The building will have 100,000 square feet of floor space. A 700 h. p. engine and four 200 h. p. boilers are to be installed. The number of spindles will be increased from 2,200 to 7,000, with 3,500 twisting spindles. P. S. Tuley is president, Thomas Williams vice-president, general manager and buyer, and Wm. Shallcross secretary and treasurer.

*Maine, Guilford. The three-story portion of the mill of M. L. Hussey Woolen Co. is being raised to four stories to correspond with the rest of the mill. New spinning machinery, which has been contracted for, will be set up in the new space.

Maine, Limerick. About 1,200 worsted spindles will be added to the Limerick Mills within a short time.

Massachusetts, Adams. A new Henderson card is being installed in the Adams Woolen Co.'s plant by the J. A. Whittle Machine Co.

*Massachusetts, Ballardvale. Work is being pushed to completion on installation of the new water wheel at the Ballardvale Mills.

Massachusetts, Charlton City. The Aldrich Manufacturing Co. has added ten new looms to their equipment owing to increased business.

*Massachusetts, East Douglas. The addition under construction for W E. Hayward & Co. is practically completed. It will be used as a dry room. No new machinery will be required.

Massachusetts, Holyoke. Farr Alpaca Co. has completed arrangements to extend its new mill to take in the entire lot which they purchased from the Holyoke Water Power Co. several months ago.

Massachusetts, Lawrence. E. W. Pitman Co., contractors, have started to excavate for section F of the Wood Worsted Mills.

*Massachusetts, Lowell. Work is in progress on a new four-story brick building for the Mass. Mohair Plush Co. which will take the place of the old two-story wooden mill.

*Massachusetts, Monson. The exterior of the new addition to Ellis No. 3 mill will be completed within a few weeks. The number of operatives at this plant is constantly being increased and the mill will soon be running on full time.

Massachusetts, North Adams. Some of the old looms in the mill of Strong, Hewat & Co. are being replaced by new looms.

Massachusetts, Pittsfield. An order has been given by the Pontoosuc Woolen Mfg. Co. for 25 looms to be installed early in 1910. These will take the place of the same number of old looms, which will be thrown out. They do not contemplate increasing their production. The new looms will be operated on worsteds.

Massachusetts, Saugus. The United States Worsted Co. has plans for a 100-foot addition to the Iroquois Mills, to be equipped with 150 looms. This is in addition to the enlargement recently completed.

*Michigan, Eaton Rapids. The only changes to be made at the Eaton Rapids Woolen Mills at this time are the installation of a new engine and generator.

Minnesota, Litchfield. A new concrete building, 75 by 50 ft., will be erected for the American Kersey Co., Inc. H. Klauser is treasurer and buyer.

New Jersey, Hightstown. The Hightstown Rug Mills have recently installed a few new Axminster looms and are starting them up on Axminster rugs, a new departure in this plant.

*New Jersey, Trenton. It is expected that the new additions to the F. A. Straus & Co.'s plant will be completed and machinery installed by November 1st.

*New York, Amsterdam. A complete new plant will be had by the Shuttleworth Bros. Co. on the completion of the proposed new buildings. The new mills will be independent of the old plant in every way. They plan to manufacture Brussels carpets and rugs at the old plant, and Wilton rugs in the new one. Contract for construction of buildings has been let to Raymond Booth of Albany, and preliminary building operations have been started. Details of buildings have been given previously.

*Ohio, Ravenna. Contract has been awarded by the Cleveland Worsted Mills Co. for spinning, drawing and twisting machinery to be installed in the addition being built at the Redfern Worsted Mills. Worsted yarns only are manufactured.

Pennsylvania, Philadelphia. The Beswick & Clay plant has been closed for purpose of installing two new boilers, 110 h. p. each, in their dye house.

*Pennsylvania, Philadelphia. Work has been started on erection of a new brick building, 50 by 25 ft., to replace the Charles Devlin plant recently destroyed by fire.

Pennsylvania, Philadelphia. Joseph Lomax, Jasper and Orleans streets, manufacturer of ingrain carpets and art squares on 33 looms, has recently purchased the lot adjoining his present mill on which he will have erected a five-story brick addition, 70 by 45 feet, operations on which will commence at once. When completed this new addition will be occupied by The Philadelphia Winding Co., winders and reelers of yarns; The Unity Worsted Co., manufacturers of plain and fancy worsteds on 80 looms; and the Melbourne Knitting Mills, manufacturers of men's and women's seamless cotton hosiery, all of whom will make considerable additions with a view of increasing their plants.

Pennsylvania, Philadelphia. Holliday & Zahn, who recently took over the woolen yarn spinning plant formerly operated by the Southwark Mills, located in the Ripka Mills, Manayunk, report that they have been compelled to lease two more floors in the building which they are equipping for twisting and other purposes.

Pennsylvania, Philadelphia. The Alva Carpet & Rug Co., recently reported by us as having purchased the building at Oxford and Hedge streets, in which their plant is located, have placed a contract for the erection of another story to the mill, 50 by 68 feet, the estimated cost of which will be $5,000.

Rhode Island, Bridgeton. Twelve old looms in the plant of W. H. Prendergast are being replaced by new looms.

*Rhode Island, Pawtucket. The new worsted spinning machinery of the Harrison Yarn and Dyeing Co. is in operation, two shifts of help being employed. This new department comprises 11 frames of 200 spindles each.

*Rhode Island, Providence. The first installment of new machinery for the Priscilla Worsted Mills has arrived at the plant.

*Rhode Island, Washington. It has been noted that the Livingston Worsted Co. would occupy the building vacated by the Narragansett Worsted Co. The building will be equipped as a finishing plant for fancy worsteds.

Rhode Island, Woonsocket. A new mill will be built in the spring of 1910 for the Desurmont Worsted Co., and 12,000 spindles will be installed. They manufacture worsted yarns on the French system, selling the product through Thomas H. Ball. Georges Desurmont is treasurer, J. W. Hamm is agent, and Louis Galle is buyer.

Mills Starting Up.

Connecticut, Danielson. Operations have been started up by the Danielson Worsted Co., giving employment to about 40 people. Later the number will be increased.

Kansas, Topeka. Plans are being made for starting up the Western Woolen Mill Co., which has been shut down for several months.

*New Hampshire, Penacook. At a special meeting of stockholders of the Concord Mfg. Co., the directors were empowered to take immediate steps looking to the resumption of manufacturing. They will begin on a small scale as samples must be gotten out.

New York, Stottville. Operations have been resumed in the weaving room at the No. 1 mill of the Stott Woolen Co. This department has been closed for some time.

Mills Shutting Down.

Pennsylvania, Philadelphia. The Lakeshire Worsted Co., with Brackney Butterworth & Co., proprietors, at Unity and Leiper Sts., manufacturers of cotton and worsted dress goods on 21 narrow looms, have shut down their plant and will sell out their machinery.

SILK.

New Mills.

*New Jersey, Paterson. S. Oppenheimer & Levy, who are to occupy the new mill being erected at the corner of Getty Ave. and George St., are importers of veilings, shawls and nettings, with offices at 98 Fifth Ave., New York. They are not ready to give detailed information of their proposed plant at this time, but expect to have matters in shape in from six to eight weeks.

New Jersey, Paterson. Jacob Wolff has leased floor space at 93 River St., in which he will put 20 broad silk looms.

New Jersey, Paterson. A. Jacobs has leased floor space in the mill at 93 River St. and will start a broad silk plant with 22 looms.

*New Jersey, Paterson. About 500 square feet of floor space in the News Bldg., Ellison St., has been leased by the Prudential Silk Co., Cohen & Lippman owners. They will manufacture broad silks.

New Jersey, Paterson. The Daggers Mill on Mulberry St. has been sold to a Mr. Borne who will start a broad silk plant with initial installation of 30 looms.

*New Jersey, Paterson. Space has been leased at Dale Ave. and Slater St. by the Universal Label Weaving Co. They will install at first 20 looms

for weaving labels of every description, and plan to begin manufacturing some time during October. Spencer Junge is president; Benj. Wehrlen, vice-president, superintendent and buyer; and Isaac Weiss, treasurer. Mr. Wehrlen, who was superintendent of the German Artistic Weaving Co., Pompton Lakes, New Jersey, for seven years, resigned that position in August.

New York, Binghamton. Negotiations have been completed for the establishment of a silk mill at this place by David D. Miller, of Middletown, Conn. It is expected to have the new plant in operation about the middle of September, making broad silks.

*New York, Theresa. The Theresa Silk Co. has been incorporated with capital stock of $50,000 to manufacture silk and cotton goods. This refers to the company which planned to locate in the Britton Chair Co.'s warehouse. The incorporators are James Moore and Liza Moore of 89 Haledon St., Paterson, N. J., and James Phelan of New York.

*Pennsylvania, Allentown. Stein Bros. Silk Co. have organized with capital stock of $10,000, and are manufacturing silk ribbons. James H. Stein is president, superintendent and buyer, and W. Anson Stein is treasurer. The plant is operated by electric power.

*Pennsylvania, Allentown. The Reading Silk Mills will now be known as the Berkshire Silk Mill Co., a new company having been organized to operate them. Samuel Thorp, formerly with the Read & Lovatt Mfg. Co., will be president and general manager of the plant. New machinery will be installed replacing much of the present equipment which is old. Broad silks will be made.

*Pennsylvania, Lehighton. It is understood that the Bryan Co., recently incorporated under the laws of Delaware with capital stock of $100,000 to operate a silk throwing mill, have not done anything toward the equipping of a plant. They are adjusting their financial matters at this time, and will make a definite report within a few weeks.

*Pennsylvania, Punxsutawney. Contract has been let for buildings for the new silk mill to Jas. K. Long & Son. The citizens of this place have subscribed $35,000 to the new company, which is capitalized at $150,000. The building is to cost $50,000, and is to be completed by January 1. Joseph Mack and Leo Schimpff of Allentown, Pa., head this project.

*Pennsylvania, Vera Cruz. The Vera Cruz Silk Co. will begin manufacturing about November 1. They will install 20 looms for manufacturing broad silks. This company has capital stock of $15,000. Amandes R. Schuler is treasurer, and George Bitzer, buyer.

Enlargements and Improvements.

*Connecticut, Rockville. Extensive changes are being made in the mill recently purchased by Belding Bros. Co. from the J. J. Regan Mfg. Co. The interior of the mill is being remodeled and fitted up for the manufacture of silk thread. Changes also will be made in the power arrangement, doing away with the old water wheels and putting in a turbine wheel. Two new 250 h. p. boilers and engines also will be installed in a new boiler and engine house to be erected. Power will be distributed electrically.

*Connecticut, Stonington. The proposed addition, 100 by 165 ft., to the buildings occupied by the American Velvet Co. will be built by the Stonington Building Co., owners of the property.

Michigan, Three Oaks. An addition is to be built for the Warren Featherbone Co. They manufacture ribbons in cotton and silk on 32 looms.

New Jersey, Paterson. The Universal Weaving Co., manufacturers of ribbons, at 112 Straight St., expect to take the balance of the mill before January 1. Twelve wide ribbon looms can be put in this additional space.

New York, Amsterdam. The Amsterdam Silk Mills, owned and operated by Julius A. Kayser & Co. as a branch of their main mill in Brooklyn, has been shut down for the purpose of making an inventory of stock on hand and making extensive repairs on their equipment preparatory to starting up again on September 7th. George Davey, manager of the mill, announces that the company is figuring on the erection of a large addition to the present mill, which will be of brick, 100 by 25 ft., in which new machinery will be installed for the purpose of enabling them to increase the production of the plant.

Rhode Island, Valley Falls. An addition to the Penikees Mill is contemplated by Reiling & Schoen. The company recently has operated a mill in Pawtucket for surplus work, but it is understood this branch has been discontinued and the machinery stored.

Mills Starting Up.

New York, Corning. Manufacturing has been resumed in the plant of the Merrill Silk Co., manufacturers of gloves, which shut down July 21.

Mills Shutting Down.

Pennsylvania, Lansdowne. A peremptory sale of the property of the General Artificial Silk Company will be held on September 1. The plant, which has been closed, was operated on artificial silk, horsehair, straw and coated yarn under the name of the Genasco Silk Works.

MISCELLANEOUS.

*Connecticut, Bridgeport. Contract for the construction of buildings for the new Henkel Lace Factory has been awarded to the Smith Building Co. of Bridgeport. The cost will be $30,000. The mill will be of brick construction, 100 by 250 ft.

Connecticut, Meriden. A small carpet mill has recently been started up on Hall St. by E. Graham.

Connecticut, Meriden. Within a few days 125 more braiders will be installed by the H. Adlman Co., making a total of 225 braiders operated.

Connecticut, Winsted. William Halse and Robert E. Morrey of Ansonia will organize the Winsted Braid Mfg. Co. with capital stock of $50,000. They have purchased the Kellogg-Wakefield Mfg. Co.'s plant and water privilege in Winsted, and expect to begin the manufacture of several kinds of braid and cords about January 1, giving employment to 100 hands. Messrs. Halse and Morrey are connected with the Ansonia O. & C. Co. of Ansonia.

*Maine, Lewiston. A 3-story addition will be built to the main building of the Lewiston Bleachery & Dye Works Co., 60 by 150 ft., also a second addition 25 by 40 ft.

*Massachusetts, Attleboro. It is understood that Chas. F. Orr, treasurer of the Orr Mfg. Co., has completed plans for his proposed new mill, mentioned in May, and that construction work will be started at once. The building will probably be 254 by 60 ft.

Massachusetts, Dedham. The Merchants Woolen Mill, which was recently sold to Frank B. Hodges of Providence, R. I., as noted, will be used for a cotton finishing plant.

Massachusetts, Lawrence. The U. S. Worsted Co. has purchased the old Chandler Flour Mills property, including water rights. It is proposed to equip the new property as an addition to the Lawrence Dye Works.

Massachusetts, Wareham. J. W. Knowles has bougth 40 acres of land on the Agawam River at East Wareham, eighteen miles from New Bedford, and will erect a finishing plant. A corporation will be formed to be called the New Bedford & Agawam Finishing Co. with capital stock of from $200,000 to $250,000. The directors are Oliver Prescott, Lloyd Swain, E. S. Graves and J. W. Knowles. Mr. Graves will be treasurer and manager. Until recently Mr. Graves was at the head of the textile chemistry and dyeing departments of the New Bedford Textile School, and by training and experience is especially well qualified for the position. Mr. Knowles advises that the water has been tested by several chemists and pronounced of superior quality for the bleaching and finishing of cotton goods. He also states that this concern is in no way connected directly or indirectly with any of the mills of New Bedford. It is a job mill, and will solicit trade from the various converters buying New Bedford goods. Mr. Knowles is treasurer of the Page Mfg. Co., New Bedford Mass.

*Massachusetts, Williamstown. Looms have arrived for the John S. Boyd Co. Other machinery has been set up and manufacturing will be started this month. Corduroys and velvets will be the product.

Minnesota, St. Paul. Work has been started on the erection of two new warehouses for the Crex Carpet Co.

North Carolina, Concord. Work on rebuilding the burned section of the Kerr Bleaching & Finishing Works is nearly completed, and machinery is being set up.

*Pennsylvania, Conshohocken. The elastic goods department of the J. Elwood Lee Co. will be enlarged upon completion of the reported additions. One building will be 4 stories high, 82 by 400 ft., and the other 2 stories high, 82 by 400 feet.

Pennsylvania, Philadelphia. In order that they might increase their plant the Hellwig Silk Dyeing Co., 9th and Buttonwood streets, have bought the adjoining building, measuring 17 by 40 feet, for the sum of $37,000. They are dyers of skein and artificial silks with a capital of $50,000; Jacob Kemp, pres. and supt., and Wm. Gutekunst, treas.

Pennsylvania, Philadelphia. The Industrial Dyeing & Finishing Co., dyers and finishers of cotton, woolen and worsted piece goods at 3829-45 Frankford Ave., have placed a contract for the erection of a one-story dyehouse, 52 by 144 feet, on the plot of ground adjoining their present buildings.

Pennsylvania, Philadelphia. The Unique Embroidery Works, Sobin & Cherkoff, has been established at 407 Commerce St.

Pennsylvania, Philadelphia. Clarkson & Jones have leased a portion of the Dale Mills at 1723 Gillingham St., Frankford, where they have installed machinery for making silk ribbons on a new process. No looms are used. The production is sold direct.

Pennsylvania, Philadelphia. It is reported that the National Cotton Tuft & Fibre Co., located in the Lee Knitting Mills, Kensington Ave. and Ontario St., have purchased a large brick building in Egg Harbor City, N. J., on Antwerp Ave. It also said that the city has donated additional land to the company for the purpose of enlarging the plant. The process of removing their machinery has now begun. The company, which has a capital of $25,000, is manufacturing cotton tufts and fibers for the mattress and upholstery trade, and has for its officers Barton L. Brown, pres.; H. H. Brown, vice pres.; Edward B. Mallison, treas. and manager, and F. H. Burch, supt.

Pennsylvania, Philadelphia. An addition will be built for the Karl Schlatter Dye Works, Inc., at Hartville and Ontario Sts. The new structure will be two stories high, 43 by 146 ft., and is to take the place of the mill destroyed by fire last July in which they dyed their oxidized black on hosiery and yarn. The upper floor and part of the lower floor will be used for dyeing oxidized black on hosiery and yarns and the balance of the lower floor for dyeing sulphur black on hosiery. The entire plant is being built on the most modern lines and will be equipped with the very latest machinery, capable of turning out the highest grade of work that can be produced. It will be in running operation by October 1.

Pennsylvania, Philadelphia. The William Yorston Co., with William Yorston & William Brown as the proprietors, are about to start up a small plant at 2531 N. Leithgow St., with three hand looms for the manufacture of rugs and summer curtains of cotton and silk, selling the production direct. They will buy 3/8, 2/16 and 2/20 cotton yarn in skeins.

Rhode Island, Crompton. A number of new looms of their own make are being installed by the Crompton Co., also new combers. The dyeing department is being changed over to electric drive.

Rhode Island, East Greenwich. The Greenwich Bleachery is being enlarged by erection of additional buildings and new machinery.

*Rhode Island, Pawtucket. Caderas & Ozanne, lace manufacturers of Calais, France, have leased the building formerly occupied by the James Brown Machine Co. on Main St., and will bring their machinery and plant here. It is stated they will give employment to about 500 operatives.

Rhode Island, Saylesville. A large addition is being built to the warehouse of the Saylesville Bleacheries.

*South Carolina, Columbia. In August it was reported at Winston-Salem, N. C., that F. T. Parker would form a company to build a mill for the manufacture of camel's hair press cloth. Mr. Parker is located at Columbia, S. C., and plans to organize a $300,000 company to build a mill at that place. He contemplates a cooperative organization among the cotton seed oil mills and states that $160,000 has already been subscribed. Mr. Parker is an experienced manufacturer of press cloth.

*Texas, Merrimac. It is reported that arrangements are being planned by the Merrimac Manufacturing Co. for erecting the new mill under consideration for some time. This is a plant to manufacture artificial silk and hair. B. N. Garrett, Dallas, Texas, is president of the company.

FAILURES AND SUSPENSIONS.

New York, Philmont. The Aken Knitting Co. of this place, and the Wiley Mfg. Co. of Catskill, have been adjudicated bankrupt. Ezra D. Delamater has been appointed referee in bankruptcy to take further proceedings in the case of the Aken Knitting Co., and George W. Plusch of Catskill, referee in bankruptcy for the Wiley Mfg. Co. It is thought that both concerns have ample assets if carefully handled, and will be able to pay all the claims against them.

FIRES.

Canada, New Brunswick, Moncton. Fire caused a loss of about $3,500 in the plant of J, A, Humphrey & Son, Ltd. The damage will be repaired at once.

New Jersey, Waldwick. The commission throwing plant of John A. Post has been destroyed by fire; fully insured.

New York, Little Falls. Several hundred dollars' damage was done to machinery by fire in the waste and batting plant of Charles W. Becker.

Pennsylvania, Philadelphia. Fire again visited the plant of O'Neill & Co., manufacturers of shoddies and wastes on Ruffner street below Germantown Ave, being the second time within a year. The damage is reported as being considerable. The buildings will again be repaired and the machinery put in operation.

Pennsylvania, Philadelphia. Fire in the Bower & Kauffman Hosiery Mill caused damage of several thousand dollars to stock and machinery, mostly by water.

FACTS AND GOSSIP.

*Alabama, Birmingham. C. Exum and associates have acquired control of the plant formerly operated by the National Hosiery & Yarn Co. The latter company has been dissolved as noted.

Arkansas, Fort Smith. S. S. Lowrey and Wm. H. Talmage, both of this place, will organize a corporation to be known as the Great Southern Cotton Mill. They are interested in information relative to buildings and necessary machinery.

Connecticut, Elmville. H. Prescott Brigham has sold his interest in the Thistle Worsted Co., and Frank Casey has been appointed superintendent.

*Connecticut, Mystic. It is rumored that the Royal Linen Mills Co. has arranged to erect a 2-story building at the McDonald Shipyard property for the manufacture of its product. This is a Connecticut corporation with capital stock of $50,000, and Samuel D. Kenne of Providence, heads the company.

*Connecticut, Plainfield. The Lawton Mills Corp. denies the rumor that they plan to build a new cotton mill at this time on the land purchased several days ago. It is understood they will, however, use this land for manufacturing purposes eventually.

Georgia, High Shoals. A storm tore half the roof off No. 1 Mill of the High Shoals Mfg. Co., and considerable damage was done by water.

*Georgia, Phelps. Buell Stark of Daltin, previously reported from that place as interested in building a cotton mill, is engaged at present in organizing a corporation with good prospects of carrying the project to a successful conclusion. No details of the proposed plant have been given out.

Georgia, Rome. Rounsaville & Bro. contemplate the manufacture of cotton rope and twine and are interested in information relative to this line of machinery. They plan to operate a small plant by water power.

Illinois, Mt. Vernon. W. C. Arthur and associates have acquired control of the plant formerly

operated by the National Hosiery & Yarn Co. at this place.

Iowa, Bonaparte. G. D. Pocock, J. W. Lane, and J. F. Garland, all of Jacksonville, Illinois, have purchased the mill of Meek Bros. Co. Mr. Pocock was formerly connected with J. Capps & Sons, Ltd., woolen manufacturers of Jacksonville, and Mr. Lane was a traveling salesman for the same concern.

*Kentucky, Louisville. At the sale of the property of the Mayfield Woolen Mills Clo. Co. a little more than $56,000 was realized.

Maine, Bath. An effort is being made to interest capital in a plan to establish a large cotton mill here.

Maine, South Windham. At the sale of the Robinson Mills, J. Koshland, a Boston wool dealer, bid in the property for the bond holders at $60,000.

*Maine, Waterville. The plant of the Wyandotte Woolen Co., formerly known as the Terry Manufacturing Co., is now running in full. Lightweight worsteds are being made.

*Maryland, Baltimore. Nothing definite can be given in regard to the artificial silk mill project in which C. E. Hertlein of New York is interested.

*Massachusetts, Blackinton. About 50 looms are now being operated at the Blackinton Mill. It is expected that within two weeks they will have about 100 looms running. It is proposed to operate 75 looms on worsteds and 25 on woolens.

Massachusetts, Holyoke. It is rumored that the Howard Ramie Fiber Co. has bought a site on Hampden St., and will locate its plant there. The efforts of this company to interest Holyoke investors have been reported previously.

Massachusetts, Holyoke. The Farr Alpaca Co. has announced that the hours of labor will be reduced to 56 a week on October 4, with no loss in wages.

*Massachusetts, Lawrence. It is announced that Wilbur E. Rowell, previously reported as purchasing the Battles Mill property, acted for George E. Kunhardt.

Massachusetts, Lawrence. It is rumored that the present Pacific Mills' print works and the print works at the Cocheco plant at Dover, N. H., will be consolidated in the new buildings to be erected east of the Wood Worsted Mills, and that the space thus vacated in the old Pacific plant will be filled with worsted machinery.

Massachusetts, Lowell. Secretary McKenna of the Board of Trade states that a large woolen manufacturing company is considering establishing a plant in Lowell. It is understood the same company is looking for favorable sites in Providence and Pawtucket, R. I.

*Massachusetts, New Bedford. The capital stock of the New Bedford Cotton Mills Corp. will be increased by the issue of 3,500 shares of common stock in place of 2,500 shares as originally intended.

Massachusetts, New Bedford. Any announcement which could be made at the present time regarding the proposed new cotton mill in which James E. Stanton, Jr., is interested would be too indefinite to be of value to the trade. The promoters have no settled plan in mind.

Massachusetts, Newburyport. The Newbury Cordage Co., which is the name of the new company which purchased the Bay State Cordage Co.'s plant from Burley & Stevens, have put a night force to work to keep up with orders.

Massachusetts, North Adams. It is reported that B. M. Ewing & Co. of New York, are negotiating for the Mayflower Worsted Mills. Practically all the creditors, it is stated, have agreed to the offer of 6 per cent. cumulative stock in settlement of their claims.

*Massachusetts, Pittsfield. James and E. H. Wilson advise that no machinery was lost in the recent fire at the Bell Air Mill. The building contained only stock for the Taconic Mill. As previously reported, the loss is fully covered by insurance.

Massachusetts, Rochdale. A large part of the machinery in the local mill of A. Howarth & Son is shut down owing to a lack of orders.

Mexico, City of Mexico. Hugo Gordon has applied to the government for concessions to enable him to establish a cotton thread factory. He asks for exemption from custom house duties on machinery and material to be imported from Europe and the United States.

Minnesota, Duluth. The Western Linen Co. has been incorporated with capital stock of $100,000 by J. H. Barnes, president; W. B. Barnes, Jr., treasurer, and E. H. Smith, buyer. Mr. Smith is local manager for the American Linseed Co. The company has incorporated for the purpose of making a linen fiber out of flax straw, and has secured the rights to what they consider the best decorticating machine ever built. They hope to produce a fiber that will meet with the approval of spinners, but if they cannot dispose of the product in this way, we are advised they will install their own spinning plant and possibly looms for weaving up the yarns. They claim to have been given assurance by practical spinners that their fiber can easily be spun. Mr. Smith is interested in information on all equipment for a plant of this nature.

Minnesota, Duluth. The Duluth Woolen Co. has been incorporated with capital stock of $15,000 by Max L. Line, Louis Singer and R. Singer.

Mississippi, Laurel. Manufacturers contemplating building a cotton mill here are negotiating with A. W. Noble, mayor of the city.

New Hampshire, Epsom. It is reported that a German company has leased the box mill of C. S. Hall and will install machines for the manufacture of silk and cotton gimp and edgings for underwear, etc.

Personals.

Chas. Davis, for the past two years designer at the Fred L. Sayles Company, Pascoag, R. I., has severed his connection with that company to accept a position as superintendent and designer at the Saranac Mills, American Woolen Company, Blackstone, Mass.

E. T. Landon, formerly bookkeeper at the Riverview Mills, Waterville, Me., who has been a resident of that city for several years, has accepted a position in New York City with one of the large College Clubs and will make his home in Brooklyn, N. Y.

Geo. Fred Coy, who has been acting superintendent of the Boston Mfg. Company, Waltham, Mass., has severed his connection with that company. Mr. Coy was in charge of the mills for this company and previous to that time was assistant foreman in the machine shop.

Harry Danielson, for two years assistant superintendent of the wool grading department at the Victoria Mills, Thornton, R. I., has resigned to accept a similar position with a firm at Jamestown, N. Y. His successor is Martin Hanson.

John J. Purcell, national secretary of the Loom Fixers' Association of Fall River, has declined the offer of again accepting the position.

President John Golden of the United Textile Workers of America, who has been attending a meeting of a committee appointed by the American Federation of Labor, at the last national convention, has returned from New York to his home in Fall River. He was accompanied by James Duncan, first vice president of the American Federation of Labor.

Charles Kendrick, pay master at the Wood Worsted Mills, Lawrence, Mass., is confined at the Hildreth House, Brunswick, Me., suffering from a severe attack of nervous prostration.

Frederick Brown, for several years an overseer in the Nashawannuck Mfg. Company, Easthampton, Mass., but who has been in Seattle, Wash., for the past two years, has again reentered the employ of the company at Easthampton, this time in the capacity of assistant to his father, Samuel, who is superintendent of the company.

Evariste E. Talbot, second hand in the weaving department at the Davol Mills, Fall River, Mass., has been appointed overseer of weaving at the Flint Mills, same city.

James H. Ashton, secretary and treasurer of the Mule Spinners' Union of Lowell, Mass., has been elected a delegate of the Mule Spinners' National Convention, to be held in Boston, beginning September 9th.

J. Dakin Kelley, overseer of finishing at the Lawrence Dye & Finishing Company, Lawrence, Mass., and one of the U. S. Worsted Company's mills for the past four years, has severed his connection with that company.

Stephen E. Rawson has accepted the position of assistant designer under designer Wendell J. Battye, at S. Slater & Sons Mill, Webster, Mass.

William Booth, overseer of the weaving department at the Taconic Mills, James and E. H. Wilson, Pittsfield, Mass., has severed his connection with that company.

William Rider, superintendent of the Somerset Worsted Mills, East Madison, Me., has severed his connection with that company.

David Welsh, overseer of finishing at the Peace Dale Mfg. Company, Peace Dale, R. I., has severed his connection with that company.

Frank A. Meyers has been appointed superintendent of the Penikees Mill, operated by Reiling & Schoen, manufacturers of silk dress goods, at Valley Falls, R. I.

J. L. Grice has resigned as superintendent of the Belmont Mills to accept a position as overseer of winding and twisting at the Shelby Cotton Mills, Shelby, N. C.

Hans S. Ringland has accepted the position as overseer of finishing at the Faulkner Mfg. Company, No. Billerica, Mass. He comes from Keene, N. H.

A. H. Bahnson has been appointed superintendent of the Pocono Cotton Mills, Greensboro, N. C. He comes from Winston-Salem, N. C.

J. F. Blanton has resigned his position as overseer of spinning at Whitney, S. C., to accept a similar position at the Tucapau Mills, Tucapau, S. C.

J. J. Nicholson from Hickory, N. C., has accepted the position as overseer of finishing at the Manetta Mills, Lando, S. C.

J. E. Ledbetter, overseer of carding at the Union Mills, Lafayette, Ga., has resigned.

Frederick Wood has accepted a position as overseer of spinning at the Lockmore Mill, Yorkville, S. C.

C. A. Mann has accepted the position as overseer of carding at the Efirds Mill, Albemarle, N. C.

J. D. Boseman has been appointed superintendent of the Lockmore Mills, Yorkville, S. C.

E. S. Ray has resigned his position as overseer of spinning, spooling and twisting at the Lockmore Mills, Yorkville, S. C., to accept a similar position with the McAden Mills of McAdenville, N. C.

James S. Downum has taken a position as overseer of carding and spinning at the Iceman Mills, McColl, S. C. He comes from Cordova, Ala.

J. H. Wilson has been appointed overseer of spinning at the Lafayette Cotton Mills, Lafayette, Ga.

David Walsh, late overseer of finishing at the Peace Dale Mfg. Company, Peace Dale, R. I., has accepted a similar position with the Pequea Mills, 22d and Spring Garden streets, Philadelphia, Pa., succeeding F. H. F. Ballou.

Henry G. Niles, son of the late Henry G. Niles, president of the South Bend Woolen Company, South Bend, Ind., will succeed his father as president of the company. Mr. Niles has been in active management for some time.

Emil Dick has been appointed superintendent of the Barker Mills, Auburn, Me. He has been acting assistant superintendent of the Bates Mfg. Company, Lewiston, Me.

J. L. Grice has resigned his position as superintendent of the Belmont Cotton Mills, Shelby, N. C., to accept a position as overseer of winding and twisting at the Shelby Cotton Mills, Shelby, N. C.

J. D. Boseman has been appointed superintendent of the Lockmore Cotton Mills, Yorkville, S. C.

S. S. Campbell has accepted a position as overseer of carding at the Mary Leila Mills, Greensboro, Ga.

H. W. Hursey, formerly with the Wilson Cotton Mill, has been appointed overseer of spinning at the Whitley Mfg. Company, Wendell, N. C.

G. H. Lokey, formerly of Calhoun Falls, S. C., has taken charge of carding at the Ide Cotton Mill, Jacksonville, Ala.

J. L. Carr has accepted the position as overseer of carding and spinning at the Montala Mfg. Company, Montgomery, Ala.

H. G. Tucker as accepted the position as overseer of spinning and winding at the Harriet Cotton Mill, Henderson, N. C. He comes from the Pee Dee Mills, No. 1, Rockingham, N. C.

H. Pennington has accepted the position as overseer of weaving at the White Oak Mills, Greensboro, N. C., succeeding Mr. Henley.

Thomas E. Gardner has been promoted from overseer of carding in the White Oak Mills, Greensboro, N. C., to succeed J. D. Campbell as superintendent.

G. D. McIntosh has accepted the position as overseer of weaving at the Cannon Mill, Kannapolis, N. C.

John R. Roberts has been appointed superintendent of the Hamburger Mills, Columbus, Ga. He was formerly overseer of weaving at the Cannon Mill, Kannapolis, N. C.

D. A. Rudisill, superintendent of the Cherryville Mfg. Company, Cherryville, N. C., has resigned to accept a position as treasurer and manager of the same mill.

P. L. West has been appointed superintendent of the Hermitage Cotton Mills, Camden, S. C. He formerly held a similar position at the Georgia Mill, Dublin, Ga.

M. M. Lehman has accepted a position as overseer of spinning at the Merrimack Mills, Huntsville, Ala.

W. P. Maguire, for over ten years boss spinner at the Beaver Mills, No. Adams, Mass., has severed his connection with that company to accept a similar position with the Whittenton Mill, Taunton, Mass.

Thomas J. Gibson has been appointed superintendent of dyeing and bleaching at the Zion Lace Industries, Zion City, Ill. He comes from Patchogue, L. I., N. Y.

Henry L. Stewart has accepted the position as overseer of finishing at the Continental Worsted Mills, Providence, R. I. He comes from the Riverside Mills, American Woolen Company, but was formerly employed at the Scotia Worsted Mills, Woonsocket, R. I.

James H. Hillens, overseer of finishing at the Wuskanut Mills, Farnumsville, Mass., has severed his connection with that company.

Geo. Smith has accepted the position as overseer of weaving at the Meredith Linen Company, Meredith, N. H. He was formerly employed at the Draper Company, Hopedale, Mass.

James Bragg, overseer of carding at the Tilton Mills, Tilton, N. H., has severed his connection with that company.

J. L. Burton, formerly agent of the Newmarket Mfg. Company, Newmarket, N. H., has been appointed agent of the Nashawena Mills of New Bedford, Mass.

Frank Dixon, overseer of dyeing at the Franklin, Glazier & Sons Mill, So. Glastonbury, Conn., has severed his connection with that company.

J. W. Ransehausen has accepted the position as overseer of finishing at the Wuskanut Mills, Farnumsville, Mass. He was formerly employed at the Blackinton Mfg. Company, Blackinton, Mass.

Geo. F. Egan has been appointed overseer of finishing at the Peace Dale Mfg. Company, Peace Dale, R. I. He comes from James & E. H. Wilson, Taconic Mills, Pittsfield, Mass., and succeeds David Welsh.

Joseph W. Burnham has accepted the position as designer for Fred L. Sayles Company, Pascoag, R. I.

Aaron Jewell, superintendent of the Oakland Mfg. Company, Reisertown, Md., has severed his connection with that company.

Alexander Murray has accepted the position as superintendent of the Oakland Mfg. Company, Reisertown, Md. He was formerly employed with A. Roberts & Company, of Claremont, N. H.

James E. Mullin, overseer of dyeing at the Charles River Woolen Company, North Bellingham, Mass., has severed his connection with that company.

Frank Brown, second hand in the weaving department at the Ray Mills, American Woolen Company, Franklin, Mass., has accepted a position as overseer of weaving at the Jefferson Mfg. Company, Jefferson, Mass.

F. H. F. Ballou, overseer of finishing at the Pequea Mills, 22d and Spring Garden Sts., Philadelphia, has accepted a similar position with James and E. H. Wilson, Taconic Mills, Pittsfield, Mass.

S. M. Lambert has accepted the position of superintendent of the Somerset Woolen Company, Monson, Mass.

Luke H. Rooney, an overseer at the Whittenton Mfg. Company, Taunton, Mass., has been appointed superintendent of the Nonquit Mill, New Bedford, Mass.

Oscar E. Braslow of Providence, R. I., has accepted a responsible position with John E. McNurty of New York, a large woolen concern. At one time he was traveling salesman for the Woonsocket Spinning Company, of Woonsocket, R. I.

John H. Osborn, who has been superintendent of the Evansville Cotton Mill Company, Evansville, Ind., for a number of years, has severed his connection with that company. His successor is Earl J. Jencks, who comes from Woonsocket, R. I.

E. C. Crawley, superintendent of the Adams Woolen Company, Adams, Mass., has severed his connection with that company to accept a position at Pittsfield, Mass.

William F. Ray will succeed Walter A. Clark, who for many years has been the successful manager of the Ray Fabric Mills and who resigned this position some time ago to accept the treasurership of the new Franklin Felt Company of that city. Mr. Ray will have associated with him as superintendent John E. Barber, formerly agent of the Charles River Woolen Company, North Bellingham, Mass.

Frank Smith, secretary of the Spinners' Union, Fall River, Mass., and employed as a spinner at the Cohannet Mill, No. 3, has accepted a similar position at one of the large mills at New Bedford, Mass.

Thomas Pendergast has accepted the position as overseer of carding at the Tilton Mills, Tilton, N. H. He comes from Brockton, Mass.

Daniel Darling has accepted the position as overseer of dressing for Geo. E. Kunhardt, Lawrence, Mass.

Thomas Hallihan has accepted the position as overseer of carding for the Cheshire Mills, Harrisville, N. H. He comes from Jefferson, Mass.

Ellis H. Kershaw has resigned as master mechanic at the Coventry Company, Anthony, R. I., to accept a similar position with the Acushnet Mill, New Bedford, Mass.

Arthur Moreau, overseer of weaving and assistant superintendent at the Priscilla Woolen Company, Spencer, Mass., has resigned to accept a similar position at the Oxford Linen Mills, North Brookfield, Mass.

Thomas J. O'Malley, overseer of finishing at the Wanskuck Company, Providence, R. I., has severed his connection with that company and is succeeded by Robert Swan.

Laughlin H. Dunn has accepted the position as overseer of finishing at the Wyandotte Worsted Company, Waterville, Me.

Joel E. Ramette, night engineer at the Alsace Worsted Company, Woonsocket, R. I., has resigned to accept a position as day engineer with the Stafford Worsted Company, Stafford Springs, Conn.

Fred McEvoy has accepted a position as overseer of dyeing at the Waucantuck Mills, Uxbridge, Mass. He comes from Farnumsville, Mass.

F. M. Townson, overseer of dyeing at the Beaver Brook Mills, Collinsville, Mass., has severed his connection with that company.

J. F. Alger, for over fifteen years overseer of shears at the Riverside Mills, Providence, R. I., has severed his connection with that company.

Geo. Wishart, who has been boss dyer temporarily during the sickness of John Kaye at the Oneko Mills, New Bedford, Mass., has taken the position of overseer to fill the vacancy caused by John Kaye's resignation.

Leonard Rushworth has accepted the position as designer at the Esmond Mills, Esmond, R. I.

Harry M. Turner has been appointed superintendent of the bleachery at the Crystal Spring Bleaching & Dyeing Company, Fall River, Mass.

Albert Frost was elected treasurer of the Crystal Spring Bleaching & Dyeing Company, Fall River, Mass., to succeed William N. McLane who resigned to accept the treasurership of the Barnaby Mfg. Company.

Percy W. Hathaway, who has been connected with the finishing department at the Peace Dale Mfg. Company, Peace Dale, R. I., has resigned to accept a position with the Piqua Mills, 22nd and Spring Garden streets, Philadelphia, Pa., under David Welsh, overseer of finishing.

Edward H. Amback has accepted the position as overseer of carding at the Medlicott Company, Windsor Locks, Conn. He was formerly employed at the Geneva Mills, Providence, R. I.

Emanuel H. Davis, overseer of spooling and dressing at the Cocheco Woolen Mills, East Rochester, N. H., has severed his connection with that company.

Harry H. Daw, designer at the Wuskanut Mills, Farnumsville, Mass., has been appointed assistant superintendent.

Alfred Drieu, Jr. has accepted the position as

overseer of French drawing at the Dunham Hosiery Company, Poquonock, Conn.

W. E. Ross has accepted the position as overseer of weaving at the Forest Mills Company, Bridgton, Me. He was formerly employed at the Wilson Woolen Company, Wilton, N. H.

H. H. Chapman, formerly of Williamston, S. C., has accepted a position as chief engineer and master mechanic at the Fairmont Mfg. Company, Fairmont, S. C.

A. H. Graham has succeeded G. F. Howard as overseer of spinning in the Golden Belt Mill, of Durham, N. C. He comes from Hillsboro, N. C.

W. A. East has been promoted from carder and spinner to the position of superintendent of the Brenham Cotton Mill, Brenham, Tex., succeeding Henry McDermott.

Henry H. Orr was elected secretary and assistant treasurer of the Orr Mill, Anderson, S. C., to succeed Calhoun Harris. Mr. Orr is a son of the late Col. J. L. Orr, founder of the mill, and has been paymaster for several years.

James Metcalf has accepted the position as overseer of worsted spinning at the Bigelow Carpet Company, Lowell, Mass. He comes from the Arlington Mills, Lawrence, Mass.

Henry McDermott, superintendent of the Brenham Cotton Mill, Brenham, Tex., has resigned to accept the superintendency of the mill at Crawford, Ga.

Will Spratlin, of the Princeton Mfg. Company, Athens, Ga., has resigned his position with that mill to accept a position as overseer of spinning with the Star Thread Mills of the same place.

W. A. Smith, overseer of spinning at the Coosa River Spinning Company, of Bon Air, Ala., has resigned.

C. B. Suttle has been appointed superintendent of the Elizabeth Mills, Charlotte, N. C. He was formerly employed at the Laboratory Mills, at Lincolnton, N. C.

H. B. Blakeley, overseer of weaving at the Gonzales Cotton Mill, Gonzales, Tex., has severed his connection with that company.

J. E. Tice has been appointed superintendent of the reorganized Beaver Dam Mills, Edgefield, S. C.

Samuel Throp has been appointed manager of the Reading Silk Mills, Reading, Pa. This mill was recently purchased by Jos. S. Mack of Allentown, Pa.

John E. Hey, overseer of weaving at the Paragon Worsted Company, Woonsocket, R. I., has severed his connection with that company.

Joseph R. Glennon, an overseer at the Bennett Mills, New Bedford, Mass., has been appointed superintendent of the New Bedford Spinning Mills in that city to fill the vacancy caused by the transfer of W. J. Jenkins to the superintendency of the Bennett Mill. Mr. Jenkins succeeds Samuel Winsper who is now at the City Mill. Thomas Gibson will be transferred from the City Mill to take the position made vacant as overseer at the Bennett Mill, succeeding Mr. Glennon.

H. H. Stewart, assistant treasurer of the Henderson Cotton Mills, Henderson, Ky., has resigned.

T. B. Moose, overseer of carding at Kannapolis, N. C., has resigned to accept a similar position at the Locke Mill, Concord, N. C.

F. E. Farrell, overseer of spinning at one of the Bessemer City Mills, has resigned to accept a similar position with the Lula Mill, King's Mountain, N. C.

T. B. Morton has accepted the position as overseer of spinning, spooling and warping at the Poulan Cotton Mills, Poulan, Ga., having come from the Fulton Bag and Cotton Mills, Atlanta, Ga.

E. E. Smith, overseer of spinning and twisting at the Wylie Mills, Chester, S. C., has resigned to accept a similar position with the Chadwick-Hoskins Company, Charlotte, N. C.

Z. V. Gray has accepted the position as overseer of spinning at the Wylie Mills, Chester, S. C. He comes from the Manetta Mills, Lando, S. C.

A. G. Stewart has been appointed overseer of spinning at the Linden Mfg. Company, Davidson, N. C.

C. R. Harman, overseer of carding at the Locke Mills, Concord, N. C., has accepted a similar position at the Granby Mills, Columbia, S. C.

J. W. Holt has accepted a position as overseer of carding at the White Oak Cotton Mill, Greensboro, N. C.

Frank L. Carpenter was elected treasurer to fill the vacancy caused by the death of Arthur H. Mason at the Davis Mill, Fall River, Mass. He has been with the Fall River Iron Works Company for a number of years, both as assistant and head bookkeeper.

Elias Kershaw, master mechanic at the Quidnick Company, Arctic, R. I., has severed his connection with that company. He is succeeded by Chas. McCormick of Georgiaville, R. I.

Orrin M. Rolfe, overseer of dressing at the Cocheco Mfg. Company, Dover, N. H., has severed his connection with that company to accept a similar position with the Salmon Falls Mfg. Company, Salmon Falls, N. H.

Eugene S. Graves, for seven years principal of the chemistry and dyeing department at the New Bedford Textile School, New Bedford, Mass., has resigned to go into business for himself.

M. D. Sullivan has been appointed overseer of weaving at the Allen Woolen Mills, Rochester, N. Y. He comes from North Adams, Mass.

R. D. Jones, superintendent of the Brown Mill, Concord, N. C., has severed his connection with that company to accept a similar position of the Cowikee Mills, Eufaula, Ala.

J. J. Huffstickler, superintendent of the Ida Mill, Laurel, N. C., has resigned to accept the position as carder and spinner at the Octoraro Mills, Clio, S. C.

James H. Quinn has accepted the position as overseer of finishing at the Tinkham Mills, Harrisville, R. I. He comes from Pascoag, R. I., and succeeds Mr. Thorpe.

Michael N. Bresett has accepted the position as overseer of weaving at the Taconic Mills, James and E. H. Wilson, Pittsfield, Mass. He comes from Warren, Mass. and succeeds Wm. H. Booth.

John Kaye, overseer of dyeing at the Oneko Mills, New Bedford, Mass., has resigned to accept a similar position with the Beaver Brook Mills, Collinsville, Mass.

Walter J. Holden has accepted the position as head designer at the Gosnold Mills, New Bedford, Mass.

John Gormley has accepted a position as superintendent of the Akela Mill, Pascoag, R. I., succeeding William Lacey. He comes from Providence, R. I.

W. Roland Holt has accepted the position as overseer of carding for the Eagle Mills, Eagleville, Conn. He was formerly employed at Chicopee Falls, Mass.

Guy Ferguson has accepted the position as overseer of finishing at the Silver Spring Bleachery, Providence, R. I. He was formerly employed at the Pontiac Bleachery, Pontiac, R. I.

Walter A. Clark, superintendent of the Ray Fabric Company, Franklin, Mass., has severed his connection with that company to accept a position as treasurer of the Franklin Felt Company. He was presented with a handsome and serviceable traveling bag by the employes of the mill.

John Murray, overseer of spinning at the Carleton Mills, Sangerville, Me., has severed his connection with that company.

Stephen Gilligan, overseer of weaving at the Mann & Stevens Mill, East Brookfield, Mass., has severed his connection with that company.

Sydney S. Baker, at one time overseer of the knitting department at the P. Bartlett Hosiery Factory, Milford, N. H., a firm which went out of business some years ago, has accepted a similar position at Laconia, N. H.

John J. Johnson, overseer of ring spinning at the Bibb Mfg. Company, Columbus, Ga., has resigned and is succeeded by John Gardner.

Walter Rigby, superintendent of the Bibb Mfg. Company, Columbus, Ga., has resigned. Wm. King has been appointed superintendent.

R. W. Tennant has returned to his old position as overseer of carding at the Tifton Cotton Mill, Tifton, Ga. He comes from Eureka, S. C.

L. B. Foster, superintendent of the Columbia Duck Mills, Columbia, S. C., has resigned to accept a similar position with the new mills at Manchester, Ga.

E. G. Madison, overseer of spinning at the Glen Raven Mills, Burlington, N. C., has accepted a position with the Lockmore Mills, Yorkville, S. C.

J. H. Lollis, formerly of the Avon Mills, Gastonia, N. C., has accepted a position as overseer of carding and spinning at Hamer, S. C.

A. I. McDonald has been promoted from carder to superintendent of the St. Paul's Mill, St. Paul, N. C.

J. W. Kaneer, general superintendent of the Lumberton Mills, Lumberton, N. C., has given up the position and will devote all of his time to the National Mills, Lumberton, N. C.

Frank Casey has been appointed superintendent of the Thistle Worsted Company, Elmville, Conn. He was formerly employed at the Danielson Worsted Company, Danielson, Conn.

Geo. C. Eaton has accepted a position as second hand in the card room at the Franklin Mills, Franklin Falls, N. H. He comes from Bound Brook, N. J.

James Hamilton has been appointed superintendent of the Norwich Knitting Company, Norwich, N. Y. He was formerly employed at the Diana Knitting Company, Johnstown, N. Y.

J. H. Brown, overseer of spinning at the Standard Spinning Company, Oswego, N. Y., has severed his connection with that company. He is succeeded by Albert E. Kay, formerly of the Brighton Mills, Passaic, N. J.

M. J. Lannon has accepted the position as overseer of finishing at the Richelieu Woolen Mill, Chambly Canton, Que., Canada.

P. H. Tobin, overseer of finishing at the Morrison Woolen Company, Dexter, Me., has severed his connection with that company.

Harry Holliwell has accepted the position as general superintendent for J. Bryer & Son Company, Paterson, N. J. He was formerly employed for the firm of Thompson & Holliwell, Philadelphia, Pa.

Charles J. Bankart, assistant superintendent and designer at the Pondicherry Company, Bridgton, Me., has resigned.

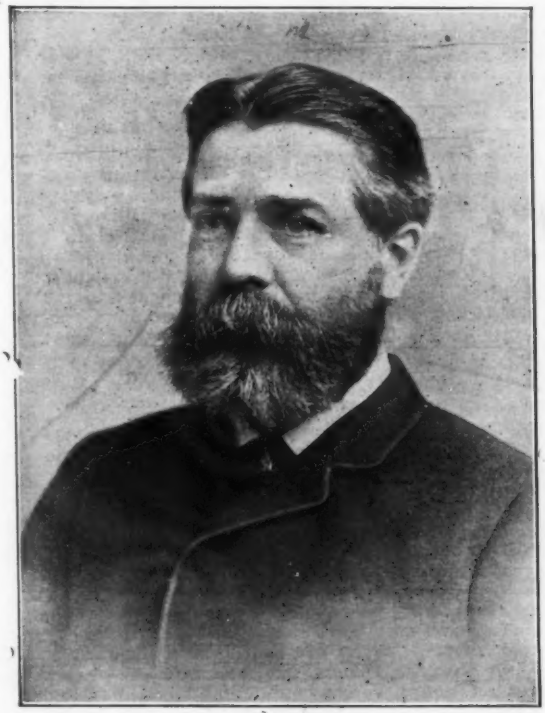
A. W. Corey has accepted the position as overseer of weaving at the Thistle Worsted Company, Elmville, Conn. He was formerly employed at the River Spinning Company, Woonsocket, R. I.

J. W. Hubert has accepted the position as overseer of weaving at the Natick Mills, Natick, R. I. He comes from the Dwight Mfg. Company, Chicopee, Mass.

Deaths.

Charles H. Willcox, son of the late James and Catherine Barry Willcox, died on September 13, 1909, at his home in Westport, Conn., where he had spent the closing years of a life, which up to the time of his retirement from active business, had been one of incessant and indefatigable industry. His funeral took place at Westport on September 16. He was born March 31, 1839.

At an early age he began to give his attention to the construction and improvement of sewing machines, at first under the able direction of his father, who jointly with the late James E. A. Gibbs, was one of the pioneers in that great industry which is now worldwide in its scope.



THE LATE CHARLES H. WILLCOX.

The natural bent of Charles H. Willcox's mind was towards mechanics and in collaboration with James E. A. Gibbs, the invention of the single-thread, chainstitch sewing machine was developed and placed on the market.

Later, Mr. Willcox gave his attention to the improvement of the thread tension, removing it from the realm of uncertainty to one of positive and automatic action.

The knit goods manufacturers were particularly attracted to the Willcox & Gibbs Trimming Machine, which neatly trims the surplus edges of the knit material following the seaming process. This new invention gave an impetus to that industry that it would not otherwise have had as long as manufacturers were confined to the old fashioned, clumsier seam.

His knowledge of the knit goods requirements led Mr. Willcox to appreciate the merit of the Overlock Seam when it was first proposed by the late Mr. Stockton Borton. Together they worked out the machine to its final form so that today the Overlock is recognized as one of the finest mechanical productions in sewing machines. At 3,000 revolutions or stitches per minute the Overlock Machine trims and stitches in one operation, the resulting Overseam being a great improvement over the seam made on the Willcox & Gibbs Hosiery Trimming Machine, which was practically superseded by the Overlock. When first marketed it was thought the field of this machine would be limited to the knit goods industry, but the ornamental character of the stitch soon pointed a way to its adoption in various other lines of manufacture.

The career of Chas. H. Willcox is an example of what may be accomplished by the man who starts life with ambition, and a determination to succeed in the task he has set himself.

His death will not in any way interfere with the management of the Willcox & Gibbs Sewing Machine Co., as he had taken no active part in its affairs for the past ten years.

William Fehr, superintendent and secretary of the Steel Heddle Mfg. Co., Philadelphia, died suddenly September 3, at his home in Germantown. Mr. Fehr was born in Switzerland, forty-two years ago. Coming to this country when 18 years of age, he rapidly adapted himself to his new environment, and developed remarkable skill as a business man. Several years ago he founded the Steel Heddle Mfg. Co., and at the time of his death was known all over the country in textile lines. Mr Fehr was well liked socially, and will be missed by an exceptionally large circle of friends.

Samuel J. Corey, head of the firm of S. J. Corey & Co., 88 Broad St., Boston, importers and dealers in dyestuffs and chemicals, died at his home in Malden, September 13. He was born in Lebanon, Conn., in 1837. Mr. Corey was a veteran of the Civil War, enlisting in Company B, First Connecticut Volunteers, April 18, 1861, and serving throughout the conflict. Honorable mention of his services is recorded in the history of the Connecticut Volunteers. Upon the conclusion of his military service he became interested in the dyestuff and chemical business in Boston, and started on a long business career which brought him a large circle of friends in textile circles. Mr. Corey was a past commander of Charles Beck Post 56, G. A. R., a man of noble character and held in the highest esteem by his comrades, and by all who knew him.

John Scott, formerly a knit goods manufacturer of Cohoes, N. Y., at one time a member of the firm of Fisher, Allen & Cook, and who also operated the Enterprise Knitting Mills of that city, died recently at his home.

New Publications.

[Any work noticed under this head can be obtained through the office of this journal.]

Hendricks' Commercial Register of the United States; The S. E. Hendricks Co., 74 Lafayette St., New York; 1220 pages, 7 by 10. Price $10.

This work contains 350,000 names and addresses of American manufacturers divided under 35,774 classifications which are arranged alphabetically, enabling quick reference to those engaged in any department of trade or industry.

Bibliography of the Cotton Manufacture; by C. J. H. Woodbury; 213 pages, 7 by 10; National Association of Cotton Manufacturers, Boston, Mass. Price $2.

This list of textile books and journals has been compiled by Secretary Woodbury and represents a vast amount of labor. The result is a reference work which cannot fail to be of great value to librarians and students of textile subjects. There are 5,000 references which are divided under the following heads: 1. Cotton Manufacture; 2. Finishing; 3. Engineering and Machinery; 4. History and Economics; 5. Cotton; 6. Journals.

Cotton Waste and Other Materials for Cleaning Machinery (Putsbaumwolle und andere Putzmaterialien); by Friedrich Polleyn; 304 pages, 5 by 7 1/2; A. Harleben's Verlag, Vienna and Leipzig. Price $1.50.

The author has succeeded in producing a very interesting and valuable handbook in spite of the apparently meager character of his subject. Following is an abstract from the table of contents: Waste Cotton and Other Materials Used for Cleaning Machinery; The Raw Material of Machinery Cleaning Materials; Proportion of Waste Cotton; Other Materials Used for Wiping Oil from Machinery; Cleaning Waste Cotton and Recovering Oil; Spontaneous Combustion of Vegetable Fibers; Wood Fiber as a Cleaning Material; Other Materials for Cleaning Machinery; Sawdust; Sponges; Wiping Cloths; Removing Rust from Machinery; Cleaning Bronze Statues; Cleaning Oil Paintings; Cleaning Polished Surfaces; Carpets, Water Colors and Other Paintings; Cleaning Carpets and Wall Decorations; Fluid Metal Materials for Cleaning Machinery. The text is in German.

Business Literature.

Scaling and Corroding Substances and Their Elimination from Water for Boilers; by J. C. Wm. Greth; Wm. B. Scaife & Sons Co., Pittsburg, Pa.

This is a 16-page booklet giving much valuable information of interest to boiler manufacturers. It is reprinted from the proceedings of the Scranton Engineers' Club and a copy can be obtained on application.

Cutting Machines; Oswego Machine Works, Oswego, N. Y.

This is a very attractive and complete catalogue of the extensive line of cutting machines manufactured by the Oswego Machine Works. This company manufactures cutting machines exclusively and make a specialty of cutters for textile mills. Their machines are in wide use in knitting mills and for pinking cloth samples. Every manufacturer using cutting machines should obtain a copy of this catalogue.

Drying in Industrial Plants; The Green Fuel Economizer Co., Matteawan, N. Y.

This is a 32-page pamphlet in which the theory and practice of drying are discussed. It contains much valuable information on a subject on which many manufacturers, superintendents and overseers are ill-informed. We advise each of our readers to obtain a copy, which can be had on request to the Green Fuel Economizer Company.

The Purchase of Coal; by Arthur D. Little, Inc., laboratory of Engineering Chemistry, Boston.

The reasons why coal should be purchased on a heat unit basis, rather than by the ton only are explained in this pamphlet; also the need for a coal carefully selected for the existing furnace conditions. The publication explains the manner in which the United States Government and the purchasing agents of large power stations purchase coal, and indicates the necessity for expert service in the selection and combustion of coal.

Victoria Sizes; H. A. Metz & Co., 122 Hudson St., New York.

This company is issuing a booklet describing in brief the various compounds manufactured by them, and used in preparing and finishing cotton and other textile fabrics. A copy will be sent on application to any one interested.

Dixon's Foundry Facings; Joseph Dixon Crucible Co., Jersey City, N. J.

A twelve-page booklet has just been issued by this company, describing their facings for various kinds of work. General information on the proper use of facings, values of different kinds, working conditions met in foundry practice, etc., is included in this booklet. A copy will be sent on application to any one interested.

Labor Saving Devices for the Knit Goods Manufacturer; Climax Machine Co., Philadelphia, Pa.

This 16-page booklet contains an illustrated description of the knitting machines built by the Climax Machine Co. There is also a description of the Climax stop motion, patent expansion stamp for hosiery, transfer cups, and other labor saving devices for the manufacture of knit goods.

The new cotton spinning mill just completed by the Shaw Cotton Mills, Inc., at Weldon, N. C., have placed order with John W. Fries, 45 Lafayette St., New York, for an equipment of the belt driven Hygrosso humidifiers.

Success of Cork Inserts.

The article on Cork Inserts as Applied to Textile Machinery, which was read at the recent convention of the National Association of Cotton Manufacturers by Mr. Lawrence Whitcomb, brings to our mind the great growth of the use of cork inserts in pulleys, loom and mule frictions and in other frictional devices, used in the textile industry, and we are pleased to recognize the growth of the corporation manufacturing this product.

Mr. William W. Whitcomb, the original patentee and president of the National Brake & Clutch Co., which owns the so-called cork insert patents and to whom patents covering these different applications have been granted from time to time, deserves much credit for his untiring efforts and unfailing faith which are responsible in a large measure for the success achieved. Mr. Whitcomb's early life in the woolen mills in Vermont has led him to appreciate existing necessities and to apply cork inserts to many uses in cotton and woolen mills, with the result that this simple and inexpensive equipment has given such satisfaction that they are now being quite generally adopted throughout the New England and Middle States.

The Hygrosso Humidifier.

We are informed that an accurate test recently made of the current consumed by an alternating direct connected motor drive, Hygrosso humidifier showed the maximum consumption to be 90 watts, a little less than the amount of current used by two incandescent 16 candle power lights. The motor which is used to drive this outfit is wound to take a normal load of 180 watts, and from the above it will be seen that the motor is carrying only half the load for which it is built. Working under these conditions, with a perfectly balanced load, with perfect ventilation which its construction allows and with a wide margin of overload the motor should last indefinitely with the minimum attention. Figured on the basis of the above test the cost of operating a system or humidifiers of the above type would be only a fraction of the cost of lighting the same mill.

John F. Street & Co., Providence, R. I.

The above is the style and title of the new firm which has just succeeded to the business of Eddy & Street at Providence, R. I. This concern is well known to the trade and enjoys a most enviable reputation in it. They handle a full line of yarns of all kinds and their business has grown to large proportions.

This company was organized in 1877. The new copartnership will consist of John F. Street and Edwin F. Sherman. Mr. Street is perhaps as well and favorably known in the yarn trade as any man in it and is recognized as an authority. Mr. Sherman has been associated with the old company for a long time and has also a good grasp of the situation and business. Our congratulations and best wishes are with the new concern.

Steam Turbine in Textile Industry.

Although steam turbines have been successfully introduced in practically all lines of industry, textile mills were among the first to recognize in them a standard and thoroughly reliable type of prime mover. In New England alone, the Allis-Chalmers Company has sold 38 steam turbines aggregating in total capacity 51,000 h. p. The power house of the new Nashawena Mills in New Bedford will contain two 3,000 k. w. and one 500 k. w. of their steam turbines. The Allis-Chalmers Company has also contracted with the Whitman Mills, at New Bedford, for power house equipment including a 2,000 k. w. steam turbine, and with the Byron-Weston Co., of Dalton, Mass., for one 750 k. w. steam turbine.

Decisions favorable to the Allis-Chalmers turbine were influenced not only by the large number of that type in successful operation and its economy in continuous operation service, but also by the fact that this type of turbine will maintain its original steam economy. The Allis-Chalmers steam turbine is of the horizontal, reaction, full annular flow type.

The Curtis & Marble Machine Company.

At the dedication of the new building recently erected by the Curtis & Marble Machine Co., Worcester, Mass., a complimentary entertainment and ball was provided by the company. The grand march was led by Hon. E. T. Marble, President of the company, and Miss Clara H. Marble, his granddaughter. Following this couple came the members of the firm and their wives, W. C., C. F. and A. C. Marble. The committee, headed by A. C. Marble, the superintendent, was made up of the several foremen.

The earliest textile machinery firm in this country was probably established about 1811. In 1821 two firms in Worcester made textile machinery. To one of these was apprenticed Albert Curtis, who started business for himself in 1831. Edwin T. Marble served his apprenticeship with him. After working for other concerns for about 13 years he returned as partner in 1863. This company can probably show the longest continuous machinery plant in the country.

Oue of a possible 135 there were about 130 employes present at the entertainment with their families, making about 300 in all. There were present 18 who were on their pay roll Sept. 25, 1884. Twenty of those at work on that date are in their employ today. They have 40 in their employ today who were working for them on Sept. 25, 1894. One has 44 years to his credit

A Substitute for Tallow.

The Arabol Mfg. Co., 100 William St., New York, state that manufacturers who still use tallow as a softener will obtain superior results by using the soluble softening oil made by them. It gives a smooth finish to the warps, makes the threads part easily in the lease roads and leaves the slasher cylinders clean and bright. It remains in sweet condition all the year around, uniform and pliable, summer and winter. It is neutral and easily handled.

A New Plant.

The Rome Soap Manufacturing Co., long one of Rome's important and widely known industries, announces that it is making arrangements for the erection of a fine, modern plant in East Rome, immediately west of the Rome Metal Company's works. The soap company has just acquired 10 1/4 acres of land as a site for its new buildings, plans and specifications for which are now being made by Houghton & Aiken, a well known firm of New York engineers. It is expected that ground will be broken this fall.

The new plant of the soap company will consist of four fireproof buildings of reinforced concrete. The factory building will be 225 feet long, 75 feet wide and five stories high. There will be a warehouse, 225 feet long, 30 feet wide and one story high. The boiler and power house will be 75 by 75 feet and the company's office building 50 by 50 feet. Each of these structures will be one story high. The plant will be connected with the main line of the New York Central by two railroad tracks, one for incoming and the other for outgoing cars.

The capacity of the concern's present factory is 15,000,000 pounds of soap and soap products a year. The new works will have a capacity of twice that amount, and there will be a corresponding increase in the number of employes. In its new home, the industry will inaugurate many improved, scientific methods of manufacturing, and the very best systems of handling raw material and finished stock also will be adopted. The company will continue to make all grades of textile and laundry soaps, automobile soaps, soap powders and other soap specialties.

The officers of the company are: President, F. W. Brown, Sr.; treasurer, L. O. Bucklin, whose home is in Little Falls; secretary, George H. Brown.

Outing of the George D. Mayo Machine Company's Employes.

The employes of the Geo. D. Mayo Machine Co. enjoyed their third annual outing at Lake Shore Park, on Saturday, Sept. 11, and as usual the management suspended business at their shop at Casino Square for the day, chartered the steamer Governor Endicott, hired Pease's band to furnish music, provided a fine banquet and invited their employes and their families, 350 in number, to come and enjoy themselves as guests of the concern. Special electric cars were provided to take the party to Lakeport, where the steamer was boarded for the Park, and the morning hours were devoted to several interesting events in the athletic line.

The banquet was served at 12.30 o'clock and was followed by a band concert and dancing in the pavilion, after which the steamer took the party for a trip among the islands, landing them at Lakeport about 6 o'clock, well pleased with their third annual outing and duly appreciative of the generosity of the managers of the concern in providing such a handsome entertainment on a large scale. Mayor and Mrs. A. C. Wyatt were among the invited guests who enjoyed the events of the day.

The Company is at present overwhelmed with orders for their "New Model A" knitter. To meet this demand they have recently made large additions to the shop equipment, and are now turning out 60 machines per week. During the month of August, and before the new equipment was fully established, 223 machines were manufactured and shipped.

Wool and the Danger Point.

Those who lead the way in the colonial wool trade seem to be bent upon creating once more a situation very similar to that which obtained in the wool year 1899-1900 and again in 1907-8. In 1900 the losses of importers were so heavy that not only were all of them seriously "lamed," but many were "killed" outright. In the Roubaix district of France, for instance, a dozen big firms succumbed in a single week, and a crisis of the first magnitude followed, which had to be met by the combined action of the banks. The losses sustained by Bradford and other West Riding operators were scarcely less serious. There was one excuse for the speculative folly which then inflated prices. Years of severe and universal drought had destroyed fully half the sheep depastured in Australia and brought down the exports of wool to about a million bales.

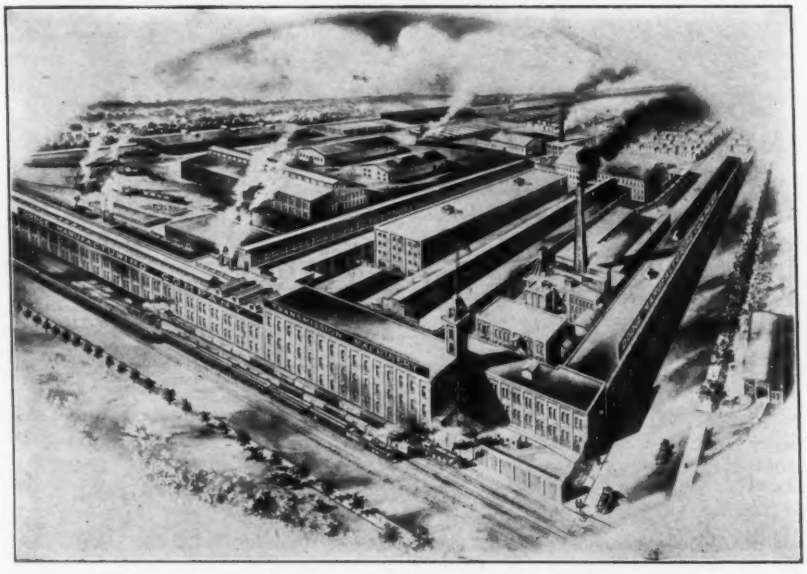
It was found, however, that people either could not or would not buy woolen or worsted goods at extremely high prices, and in six months the price of wool fell about 50 per cent. Again, in 1907-8, prices went up by leaps and bounds, became top-heavy, and tumbled into ruins, and again the losses of importers were enormous. Today prices are again at a very high point, and the cablegrams from Australia reveal a dangerous situation. Wool and tops are dear enough at Bradford and on the Continent, but it is said that wool is a good penny dearer in Australia than it is either in the West Riding or on the Continent.

At Brisbane ten days ago and at Sydney last week wool of super 60s quality was sold, we are informed, which will cost about half-a-crown when it is combed at Bradford or any Continental consuming center. It now looks as if merino wools in Coleman St. tomorrow would be put up fully 10 per cent., and of course it goes without saying that on Thursday Adelaide will not lag behind. Only about 18,000 bales will be available at Adelaide. Either more growers have shipped to London for realization this season, or, more probably, the weather was so wet all through July and the early days of August that shearing was much delayed. It is not conceivable that growers should delay even for a few weeks the turning of their clips into cash. It is an opportunity which, once deferred, may not recur.—The Manchester Guardian.

The Dodge Manufacturing Co.

That they operate the largest plant in the world for the manufacture of machinery for the mechanical transmission of power, is the claim with the Dodge Manufacturing Company, Mishawaka, Ind., whose buildings cover nearly 40 acres in a 60-acre location on the Lake Shore & Michigan Southern Railway. There is annually consumed in these works 20,000 tons of pig iron, 7,000,000 feet of lumber, 900 tons of steel and structural iron, 6,200 tons of steel shafting and 9,000 tons of coal.

The annual product is 250,000 "Independence" wood split pulleys, 100,000 "Dodge Standard" iron split pulleys, 90,000 solid iron pulleys, 95,000 hangers, 150,000 bearings of all types, 4,000 friction clutches and more than 2,000,000 lbs. of bearing metal. The steam boilers have a capacity of 1,500 h. p. and the steam engines 1,500 h. p. with electric generators of 250 k. w. The steel shop, in which the Eureka water softener and purifier is made, has a capacity of 52 fully equipped machines per annum.



THE DODGE MFG. CO.'S WORKS.

Change of Ownership.

A notice has been sent out by Paxton & O'Neill, heretofore doing business at 541 North Third St., Philadelphia, Pa., that the partnership has dissolved by mutual consent, Mr. Ellis I. O'Neill retiring. The business will hereafter be conducted by Mr. John B. Paxton under the name and style of Paxton & O'Neill.

This concern builds a line of automatic knitting machines and are well and favorably known to the trade, their customers extending all through the knit goods sections. This partnership has been in existence nearly a quarter of a century. We bespeak for the company in its present new shape its full share of prosperity.

Spiral Wire Belt Lacing Device.

Wire lacing for belts has of late years become the standard method of belt fastening in large establishments. The operation consists essentially of threading a coil of wire into the edge of each belt, flattening these coils down, interlocking them on the two edges and inserting a raw-hide pivot or pin to complete the hinged joint. About the only objection to this process in the ordinary shop is the expense of the apparatus required for coiling and inserting the wire. A device of great simplicity for performing this operation has been invented and is now being placed on the market; it is so inexpensive that the smallest shops can afford to use it.

A nickel and polished pattern plate is the essential feature of the invention. Into this the edge of the belt to be laced is placed, being held there by inserting two thumb tacks through holes in the upper lip. With the awl which is furnished with the outfit, the operator then pierces holes through the belt at the bottom of the slots formed in the turned up lip of the pattern plate. After all the holes have been pierced, a steel wire is threaded through them in helical form, over the wire mandrel which lies inside the lip of the plate.

After threading, the belt is removed from the plate and the mandrel removed from the belt. Then the wire lacing is squeezed in the vise flat and even with the belt, or pounded down flat on the bench. The ends of the wire are caught in

and clinched to prevent them from loosening.

The pattern plate is next reversed, and the other end to be joined is inserted in place. The slots on this other end of the plate are reversed, so that one of the wire coils will be right hand and the other left. This is necessary to permit them to interlock. The same operation of threading and pounding down is repeated with this end of the belt. The two ends may now be brought together with the coils interlaced, when a raw-hide pin or pivot is inserted, thus locking the joint, but leaving it hinged and flexible so as to be adapted for use on the smallest pulleys.

The outfit provided includes besides the pattern plate, awl and mandrel just described, a set of raw-hide pivots, a supply of wire lacing, extra awl points, thumb tacks, etc. The plate may either be held in the vise, an attachment being provided for that purpose, or it may be held to the bench by means of buttons, also furnished with the outfit. It should be noted that by laying the belt crosswise in the lip, the side of the plate may be used as a gage for squaring the ends, thus materially assisting in producing a serviceable and efficient joint.

The Crocker-Wheeler Company.

Several large orders for direct current apparatus have recently been received by the Crocker-Wheeler Company of Ampere, N. J. Among these is one from the Southern Iron & Steel Co., of Roger, Ga., calling for two 250 k. w. engine type, 550 volt, direct current generators and 275 h. p. in 500 volt, D. C. motors. This is in addition to a recent order for 1450 k. w. in engine type generators and 1200 h. p. in slow speed motors from the same concern. The Republic Iron & Steel Co., Youngstown, O., placed an order for a 600 k. w., engine type, 250 volt, direct current generator, which will be added to a plant consisting of two 300 k. w. Crocker-Wheeler generators. Another order has been booked from the Nonquit Spinning Co., New Bedford, Mass., covering 375 k. w. in 250 volt, Crocker-Wheeler Type D, direct current generators. One 250 k. w., 250 volt, engine type, direct current generator, and two 50 h. p. motors are to be installed in a woolen mill for the Southwark Mills Co., of Philadelphia, Pa. Two 75 k. w., engine type, 125 volt direct current generators will be installed in the factory building of Goodman, Loeb & Co., Philadelphia, Pa.

Pennsylvania, Allentown. Abraham Nathan is president of the Astron Silk Co. and Wm. Beresin, treasurer and buyer. This plant is run on broad silks, with an equipment of 23 looms.

Pennsylvania, Chambersburg. Judge Archbald of the Federal Court has ordered the trustees in bankruptcy to sell out the plant of the Chambersburg Silk Mills, which contain 100 looms formerly operated on broad silks. The date of the sale has not been set.

Pennsylvania, Chester. On account of not being sold at the first sale, held some time ago, the buildings and equipment of the Lincoln Manufacturing Co., located in Chester, will again be offered by the receiver at public sale on Oct. 7.

Meeting of National Association of Cotton Manufacturers Continued from Page 122.

Paeumatic Service for Cleaning Textile Machinery.

ALBERT W. THOMPSON, Manchester, N. H.

The use of compressed air for cleaning textile machinery is a subject by no means new to many who are present today, but the methods employed in different mills have varied widely, and it is the writer's purpose to describe here in detail certain methods now in general use in the Amoskeag Manufacturing Company which are the result of several years of experimental work.

Our first compressed air plant was installed for the operation of pneumatic tools, and with no idea of making use of air for cleaning purposes, but as the compressed air service extended to most of the departments where our larger generators and motors were located, the use of air for cleaning our electrical equipment followed almost immediately in natural sequence. For this purpose we commenced with an ordinary garden hose and nozzle, but were soon compelled to substitute a special nozzle with a smaller aperture on account of the heavy duty upon our air compressor during the hours when cleaning was in progress.

The increase in the use of pneumatic tools was unexpectedly rapid and new compressors were soon installed at different points in the yard, so that in the course of two or three years all our mills had been supplied with pneumatic service pipes.

The napping department was the first to ask for air cleaning and the results were illuminating. The stoppage for cleaning the nappers was at once reduced from twenty-five to thirty minutes daily to from five to ten minutes. The abuses which immediately followed were equally illuminating. Employes, more zealous than wise, undertook with great enthusiasm to sweep the floor with an open hose, from which the nozzle had been removed, while others with greater discretion sought more air by enlarging the nozzle openings with file tangs, etc. Such wasteful methods were checked by limiting the amount of hose allowed to each room and riveting into the end of the hose a special one piece nozzle with a hardened steel bushing forced into the tip. A small reducer was also surreptitiously inserted in the main supply line, which then refused to deliver more air than was required for reasonable usage, and in spite of bitter complaints of the paucity of the air supply the work of cleaning went merrily on.

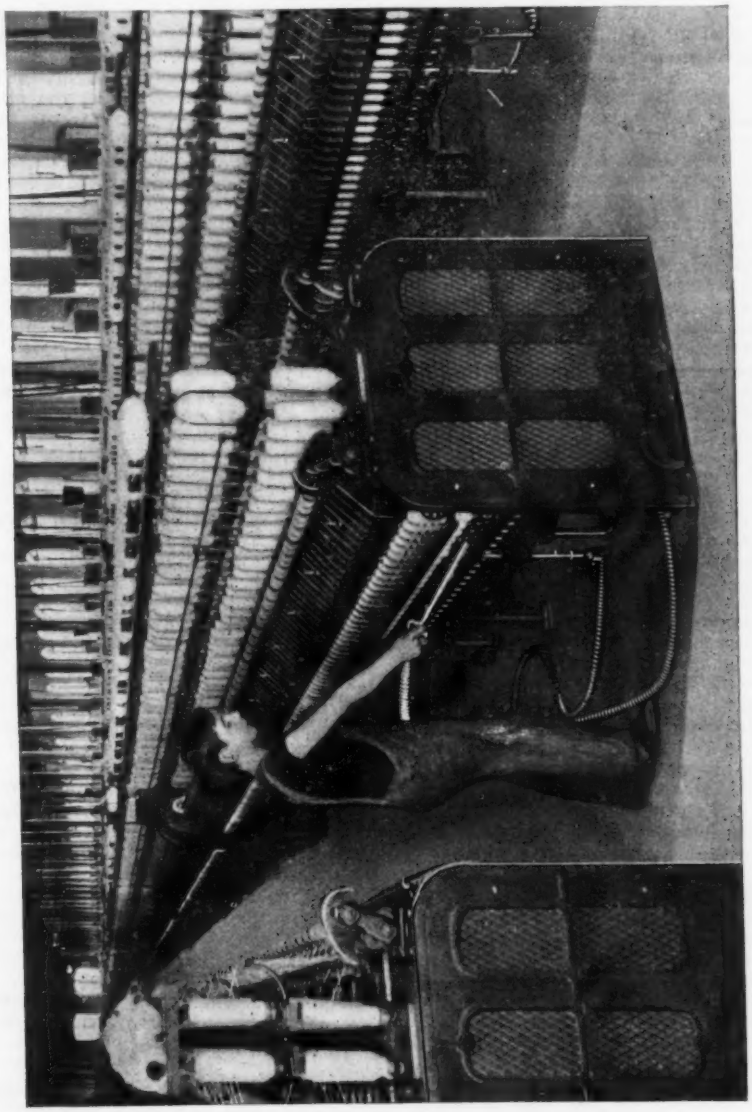
Tentering machines and stock dryers next claimed attention, and it was found that the time required for cleaning could easily be reduced in the ratio of ten minutes with the nozzle to every hour required for hand cleaning. As such machines deliver a very large product the importance of the increased time thus rendered available for production is quite apparent.

Until within the last two or three years no serious attempt was made to supply air cleaning to spinning frames and looms, for the writer must confess here that he had always discouraged such

ideas, as they suggested to his mind the necessity for a compressor plant of alarming proportions. The first step in the development of cleaning in this latter field was the equipment of one section of one of our large spinning rooms. The results were so encouraging that the whole room, containing 50,000 spindles was soon afterwards equipped.

It was at this point that one important principle was discovered, upon which I wish to lay especial emphasis, since its discovery made the extensive use of air cleaning practical with much less use of air and expenditure of power than had previously been considered possible.

A jet of air from a small aperture at the end of a thin tube will do more and better work than a powerful blast from a comparatively large nozzle. The small aperture is not only more economical in its use of air but it is easier to control, and the tip can be applied directly at the point desired, dislodging the dirt and lint with so little disturbance that it will settle at once to the floor, where-



CLEANING TEXTILE MACHINERY BY THE COMPRESSED AIR METHOD.

as the large nozzle not only fails to reach the desired points effectively, but the draught induced by the powerful blast carries the dirt and lint to neighboring machines with such disastrous results as may be easily imagined.

We found to our surprise that by using such a nozzle it not only became possible to clean frames while in motion, but also that better results could be secured by cleaning while in motion than while the frames were idle. In our ring spinning rooms everything below the thread guides, including cylinder bearings, is now cleaned without stopping the frames, the only exception being the lever weights, for the cleaning of which the frames are stopped once in two weeks for about three minutes. Cleaning the spindle rail and spindle bases with the nozzle is also very effective in keeping the bands free from lint.

Many manufacturers seem to believe that it is impossible to clean with air without more or less lint being spun into the yarn, but nothing can be simpler. In order to spin the lint into the yarn while the frame is in motion it is clear that the lint must settle into the roving itself back of the rolls or into the thread between the front roll and the thread guide. At any lower point than this the rotary motion of the spindle produces a strong centrifugal draught, which absolutely prevents lint from being caught in the thread. Consequently, if the operative in cleaning keeps the point of the nozzle pointed downward at the proper angle no lint rises above the thread boards and no trouble ensues. It is also apparent that with the spindle at rest the lint is free to settle on the thread and on the bobbin. Practice also shows that the end in motion is absolutely unaffected by the blast of air, while a stationary end breaks very easily. To clean the lever weights it is necessary to insert the nozzle back of the guides, pointing across the frame and upward. This necessarily blows more or less lint upward, and for this operation it is consequently necessary to stop to avoid spinning in. The process of cleaning the separators while the frames are in motion, however, keeps the outer parts of the lever weights comparatively clean, and the stoppage for inner cleaning is only necessary at long intervals.

For the benefit of those interested in further details a table is appended, showing the actual cleaning organization in the spinning room of our No. 9 mill, previously referred to, with net savings effected, as compared with the former cleaning organization.

In discussing this case with one manufacturer the objection was raised that a cleaning organization was superfluous inasmuch as cleaning could perfectly well be performed by spinners or doffers. While this is of course true, the time devoted to cleaning is necessarily not available for spinning or doffing, and I firmly believe that a special cleaning organization in a large spinning room will show increased economy whatever the method used. The installation of air cleaning in our spinning rooms has also resulted not only in more thorough cleaning of the frames but also in more frequent cleaning, although at considerably diminished expense. The general condition of the room is also visibly improved and the possibilities of the starting of a fire or of the spreading of fire are greatly reduced.

Another great convenience, especially in spinning and carding rooms, is the cleaning pole for overhead work. This is a light wooden pole made of two grooved pieces glued together, a light brass tube running the whole length of the pole in the grooves with the hose attached at the lower end and a reduced tip at the upper end. Pulleys, shafting and ceilings are easily and thoroughly cleaned by this method and the cleaning is infinitely more thorough than is possible with brooms or brushes and much less laborious.

In the weave room the air nozzle is just as efficient and desirable as in the spinning room. A weaver will clean a loom more thoroughly in two minutes with a nozzle than is possible in twenty minutes by hand. The necessity for a special cleaning organization is not as great as in spinning. In some of our rooms the section hands do the cleaning. In others it is done by the weavers themselves, one hose and nozzle being passed from hand to hand.

Northrup looms in particular are benefited, since, on account of the large number of looms operated by one weaver, the stoppage for cleaning by hand is relatively great.

Furthermore, Northrup looms and automatic box looms have such a multiplicity of small parts that it is practically impossible to keep them in a properly clean condition by any other means. It is by no means uncommon for some of these intricate mechanisms to become so badly clogged with dirt that they fail to operate—a difficulty which proper use of the nozzle will absolutely prevent. The cost of cleaning in weave rooms is inconsiderable. I am informed that in some rooms, where special help are employed for cleaning, the adoption of air cleaning has actually cut the cost in two.

Roving machinery presents no difficulties and the running gear may be cleaned even while in motion without danger to the operative.

Slashers and all kinds of cloth finishing machinery which handle individually large quantities of goods are greatly benefited by air cleaning also.

Harnesses, as they come back to the drawing-in room or warp-drying machine are given a thorough cleaning. For this purpose the harnesses while being cleaned are hung on a frame in front of a hood from which the lint and dirt dislodged by the nozzle is exhausted through a fan to a dust collector.

As to apparatus employed the writer has found that a pressure of thirty pounds will give good results, although sixty pounds gives more satisfaction and is absolutely sufficient. Air compressors should be provided with receivers of ample size, and all branch pipe lines should be provided with separators and drips which should be blown out with sufficient frequency to keep the lines free from condensed moisture.

The most successful type of nozzle is arranged to close automatically when the operative releases a small finger lever. The tip is a piece of a quarter-inch pipe, eight or ten inches long, ter-

minating in a reduced end with a small aperture. At sixty pounds this nozzle consumes about sixteen cubic feet of free air per minute, which is ample for any ordinary requirements.

Fifty foot lengths of hose should be used and taps should be provided at such intervals that the nozzle may be easily carried to the desired points. A short piece of hose or "leader" should be used at the tap end. The "leader" receives the hardest strains when the hose is being pulled about and saves wear and tear on the main hose. Special "quick hitch" couplings should be used. Several types of these are now on the market, and they are all superior to the ordinary threaded union type, being more convenient and much less apt to permit leakage. Three-eighths inch hose will last longer than larger sizes on account of its light weight and the ease with which it may be pulled about. The writer believes that armored hose is the best. Iron armor is preferable to steel as steel armor is so elastic that it soon becomes loose. Hose provided with a special cotton woven jacket with an oilproof covering also gives good satisfaction. The best hose obtainable is none too good as the wear and tear, due to pulling about over the floor and around corners of frames, is very severe.

Special valves or cocks should be used without handles on the stems. The stem is provided with a square nut which can only be operated by a special socket wrench which may be supplied to the proper operatives. This will prevent much mischievous waste of air by irresponsible help.

A heavy "peak load" on the compressors may be avoided by the practise of continuous cleaning in rotation in large departments or by the establishment of different periods of cleaning in different mills.

The cost of power for cleaning is much misunderstood. The type of nozzle described uses an amount of air corresponding very closely to 2 h. p., but as the duty is intermittent the average load is considerably less and depends upon the practice observed. The relatively small importance of the power is quite apparent. For example: In the spinning room previously described are 50,000 spindles using about 800 h. p. For about three-quarters of the time only one nozzle is in use and during the remaining one-quarter, three are in use, making an average of about 3 h. p., or less than one-tenth of one per cent. of the total power used in the room. In return for this small expenditure of power an increased production of two per cent. is secured, to say nothing of reducing the cost of operation. Considered either at fractional or actual cost the matter is equally unimportant.

In closing I have only to say that the investment in a compressed air plant will yield liberal returns when used for cleaning alone. The added advantage of pneumatic power which may be used to operate mechanical appliances such as compressed air motors and tools, now so widely used, should also be considered, and the writer firmly believes that in the near future all progressive mills will come to consider pneumatic service an essential part of their mechanical equipment.

CLEANING ORGANIZATION IN RING SPINNING ROOM.

Room contains 256 frames, 200 spindles each, a total of 51,200 spindles, on 26s warp and filling. Eight sweepers sweep for 32 frames each, every 45 minutes, except on Friday, P. M., and Saturday (half-day), when six sweepers cover 42 or 44 frames once an hour.

One boy with air nozzle:

a. Cleans lever weights for 128 frames on Monday.

b. Cleans head and foot ends, gears, boxes, etc., for entire room on Tuesdays, Wednesdays, Thursdays and Friday A. M.

c. Cleans head and foot ends and underwork (rails, spindle bases and all parts below) on Friday P. M. and Saturday A. M.

Two sweepers, taken from regular force, with air nozzles assist in cleaning head ends, foot ends and underwork Friday, P. M. and Saturday, A. M.

Air is used for between three and four hours each half day, and the remaining time is devoted to miscellaneous cleaning, such as wiping of all boxes, etc., each frame receiving a thorough wiping once in four weeks.

Spinners brush off rails once each half day, requiring between five and ten minutes. This is only a superficial cleaning to keep rails free from fly, as the nozzle leaves the rails free of all heavy and sticky accumulations. Spinners also clean thread boards and upper work as usual.

ECONOMY.

As compared with former cleaning organizations, the new organization showed an actual reduction in the payroll amounting to over $900 per year.

The stoppage for cleaning is diminished by over one hour per week, which corresponds to an increased production of two per cent.

Based on the total payroll the annual saving represented by this increase in production is over $700 per annum, a total annual economy of $1,600.

After deducting all charges for cost of power, hose, etc., and all charges against cost of installation, a handsome net economy must still remain, without attempting to fix any value on the improved quality of product which certainly exists.

Pennsylvania, Pottstown. The Gold Seal Knitting Mills which started about July 1 with 12 knitting machines at 70 N. Washington St., on account of meeting with great success, have been compelled to remove their plant to 58 S. Charlotte St., and increase their machinery. They are now operating 25 knitters on 200 needle men's half hose of mercerized cotton.

Pennsylvania, Philadelphia. The Roxboro Hosiery Mills, who have been manufacturing a line of men's and infant's seamless hosiery, have recently increased their equipment to 100 knitters and added a line of ladies' seamless gauze stockings. They report that their production on this line of hose was sold up within a week after being shown to the trade.

Recent Textile Patents.

BRAID, Cord Making, and Similar Machines. Carrier for. 931,083. Anker Petersen, Chelsea, Mass.

BRAIDING MACHINE. 933,339. Robert C. Rahm, Wyomissing, Pa.

BRAIDING MACHINE. Sectional. 933,340. Robert S. Rahm, Wyomissing, Pa.

COMBING MACHINE. 933,207. James Southwell, Providence, R. I.

COTTON GIN. 931,801. William M. Rheem, East Boston, Mass.

COTTON. Machine for Compressing. 931,762. Watson M. Holmes, Hoosick Falls, N. Y.

COTTON PICKERS. Suction Head for Vacuum. 932,068 John S. Thurman, St. Louis, Mo.

COTTON PRESS. 932,354. Avery H. Thomas, Little Rock, Ark.

FABRICS. Machine for Cutting Friction. 933,688. Leonard Atwood, Philadelphia, Pa.

KNITTED FABRIC. Ribbed. 933,673. Robert W. Scott, Leeds Point, N. J.

KNITTING MACHINE. 932,578. Andrew W. Redin, Rockford, Ill.

KNITTING MACHINE. 933,016. Josiah Black, Philadelphia, Pa.

KNITTING MACHINE. Circular Automatic Stocking. 933,443. Joshua D. Hemphill, Central Falls, R. I.

KNITTED WEB. Ribbed. 932,336. Robert W. Scott, Leeds Point, N. J.

LOOM. 933,187. Hector LeDoux, Worcester, Mass.

LOOM. Automatic Weft-replenishing. 932,131. George F. Hutchins, Worcester, Mass.

LOOM. Haircloth. 931,276. George S. Cox, Edge Hill, Pa.

LOOM PICKER Mechanism. 933,403. Bartholomew Trimble, Providence, R. I.

LOOMS. Spooler for Pile-fabric. 933,213. Fred A. Whitmore, Philadelphia, Pa.

LOOM Take-up Mechanism. 931,745. William E. Fischer, Paterson, N. J.

LOOM Temple Attachment. 932,022. Belonie Janelle, Manchester, N. H.

LOOM Thread-parting Mechanism. 931,913. Walter E. Clifford, Hopedale, Mass.

LOOM SHUTTLE. 933,376. Joseph Lacroix, Fall River, Mass.

LOOM. Weft Replenishing. 932,178. Eppa H. Ryon, Worcester, Mass.

LOOM. Weft Replenishing. 932,134. Lawrence B. Jenckes and George F. Hutchins, Worcester. Mass.

LOOM. Weft Replenishing. 932,119. Albert A. Gordon, Jr., Worcester, Mass.

LOOM. Weft Replenishing. 932,831. Charles Tiberghien, Tourcoing, France.

LOOM. Weft Replenishing. 933,492. Eppa H. Ryon, Worcester, Mass.

LOOM. Weft Replenishing. 933,613. George B. Ambler, Leominster, Mass.

LOOM. Weft Replenishing. 931,829. Horace Wyman, Worcester, Mass.

SHUTTLE. 932,180. Edmund H. Sawyer, Pawtucket, R. I.

SHUTTLES. Quill for Narrow-ware. 933,319. Frank E. Mellon, Philadelphia, Pa.

SHUTTLE. Automatically Threading. 933,497. Edward S. Stimpson, Hopedale, Mass.

SPINNING FRAME Attachment. Ring. 932,482. Alfred A. Lovejoy, Lowell, Mass.

SPINNING MACHINE Attachment. Twine. 931,827. Eugene C. Williams, Stillwater, Minn.

THREAD CUTTER. 932,788. John W. Klemm, Mena, Ark.

WOVEN FABRIC. 932,198. William Walker, Philadelphia, Pa.

Recent Textile Trade Marks Registered.

"Thoroughbred." Overalls, jumpers, etc. Maxwell, McClure Fitts Drygoods Co., Kansas City, Mo.

"Wizard." Hosiery. Richmond Hosiery Mills, Chattanooga, Tenn.

"Hop-Skotch." Hosiery. Richmond Hosiery Mills, Chattanooga, Tenn.

"Priscilla." Hosiery. Richmond Hosiery Mills, Chattanooga, Tenn.

"Thermae." Toweling. Slater Mfg. Co., Pawtucket, R. I.

"Black Bird." Woven or fabric belting. The Rossendale-Reddaway Belting & Hose Co., Newark, N. J.

"El Famoso Trabuco." Cotton piece goods. Isidoro Gelbtrunk, New York.

"Rob Roy." Drawers and undershirts. Hutchinson, Pierce & Co., New York.

"Botany." Woolen and worsted piece goods. Botany Worsted Mills, New York.

"Silkataff." Petticoats, dress skirts, etc. Hirsch & Morgan Co., Brooklyn, N. Y.

"Merry Jester." Hosiery. E. M. Townsend & Co., New York.

"Buddha." Broad silk in the piece. Rogers & Thompson, New York.

Pennsylvania, Philadelphia. F. Bruger, 3604 Germantown Ave., is looking up looms, winding frames and folding machinery, for the equipment of a plant for the manufacture of textile fabrics.

Pennsylvania, Philadelphia. With Thomas Boggs, Samuel R. Boggs and George W. Boggs as incorporators, a charter has been asked for the Model Mills Co., for the manufacture of carpets, rugs, etc. The plant is in operation at 2d and Allegheny Ave., where they are running 83 looms on ingrain carpets.

*South Carolina, Lowndesville. D. L. Bomes is mentioned as actively interested in the cotton mill projected at this place.